

# AVIATION WEEK

JUNE 20, 1949

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The U. S. Navy's new jet fighter, the PANTHER is designed to operate from either carrier or land bases. In addition to being capable of highest speeds, the PANTHER possesses exceptional maneuverability. In design, construction, and outstanding performance characteristics, it is a worthy successor to those great fighters, the WILDCAT and the HELLCAT which, during the last war, won such distinction as dependable units of the Navy's gallant air arm.



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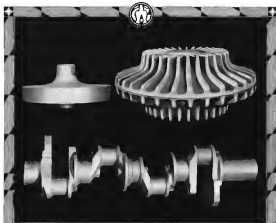
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ADDITION WEEK, June 20, 1949





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## Congress Plans Cool

Congressional enthusiasm for legalizing testing of 70 groups has cooled.

The measure now passed by the House in mid-March, but the Senate Armed Services Committee has delayed little indication to act on it as the session. Sen. Lyndon Johnson (D., Tex.), a member of the committee and one of the leading supporters of a strong air arm on Capitol Hill, commented:

"If we haven't the money to appropriate for a 70 Group program, it seems rather inconsequential as to whether or not we're authorized. It would be good as a yardstick, with which we could measure our actual air strength."

This is a good attitude. In addition, some Congressional members are antagonistic. They feel the 70 Group authorization would mean a percentage increase for USAF appropriations too great for the Federal treasury to support.

Senators of Delaware Louis Johnson has given the 70 Group authorization full fourth priority as bills pending before the Senate Armed Services Committee. Members more vital to the armed services, he said, are the pay raise bill, legislation authorizing a \$425 million public works bill (projects totaling \$450 million are planned for construction in the 1955 fiscal year), and legislation authorizing \$111 million for wind tunnels under the so-called "army plan" of the armed services and National Advisory Committee for Aeronautics.

## Valuable Study

All pilots will be working with reference to results of the Navy's study on the effects of stimulants on flying ability.

See Navy enlisted crew are being used as guinea pigs in the experiments being conducted by the Naval Medical Research Institute at Bethesda, Md. All flying is done in a Link trainer. Among the stimulants to be tested: alcohol, snuff, pills, nicotine and caffeine.

## Air Games

U. S. Air Force will participate in game exercises this summer over Europe with planes of four other countries. This will be the first official U. S. participation in the Western Defense Conference (Western France, Holland and Belgium) despite the fact that the

## Research Facts

Real significance of the super sonic flight of the Bell X-1, rocket powered research plane, according to NACA research director Dr. Hugh L. Dryden, are not in the high speeds (1000 mph and Mach 5.1) attained but in the quantitative data obtained on drag, stability, transition, and on loads at all speeds within the transonic range.

Dryden characterized the X-1 as a model for the design of modern, transonic and supersonic airplanes are concerned. He pointed out that only a rocket motor could produce sufficient power to push the X-1 to supersonic speeds.

He indicated that other research planes in the past NACA USAF-Soviet high speed flight research program would offer more efficient approaches to supersonic flight than the X-1.

North Atlantic Pact will probably not have been signed by the Senate when the gases begin.

Boeing B-70 based in England and Lockheed F-80s from Germany scheduled to depart over Europe next month and again in September.

Meanwhile U. S. Air Force is searching for surplus aviation equipment in War Assets Administration stock for material to be used in the training and program in Atlantic Pact nations.

## Air Mail Promotion

Postmaster General Jesse Douglas has been expected to drop a \$100,000 program to promote the air mail volume of feeder lines, by Sen. Lyndon Johnson (D., Tex.), a member of the Senate Interstate and Foreign Commerce Committee. Douglas agrees with Johnson that this would be one possible way to reduce the department's air mail deficit.

Under the replacement into post boxes, Post Office pays for considerable space it does not utilize. A bonus in feeder air mail volume would give the department additional revenue, but involve no additional outlay in crime prevention. Johnson plans to push the program in Congress.

# NEWS SIDELIGHTS

Advancement of schedules, done, Johnson predicts, would instantly increase feeder volume. Many businesses, he reports, have been slow on short lead orderings, but as business their earnings have not moved slowly and been delayed. Doubtless is debated about the program, pointing out that Congress has usually dropped all appropriations for postoffice, out-pays.

## ALPA Plans

An Line Pilot Ass'n is looking for an airline pilot to leave the cockpit for a \$10,000 a year desk job as executive vice-president of ALPA and No. 2 man in President Don Bohde.

ALPA voted the job at its convention last November in Chicago with notes that the post be filled within 60 days.

However, the group has been unable to persuade a union pilot to take the post, but a \$10,000 job would mean if he went off flying status. ALPA wants the executive vice-president to take over of the work load of Bohde and in put it together thoroughly familiar with modern airline operational problems on the executive staff.

## Subsidy Fight

Senate Appropriations Committee, which has reportedly called for suspension of subsidy and service mail payments to the airlines over the past few years, is now ready, determined to force the question.

The committee dropped \$16 million off the second delivery appropriation bill for domestic airline payments, despite testimony of Post Office officials that the department is now without funds to make payments to carriers for the remainder of that fiscal year.

Senators indicated the action is pending the measure. The \$16 million estimate was not submitted to Congress until after the second delivery bill had passed the House. Hence, for the time being the appropriation is not.

Sen. Bennett McPherson (D., S. C.), chairman of the Post Office appropriations subcommittee, told Associated Press that "if the Civil Aeronautics Board cannot approve subsidy and carry on normal payments, there is no chance of getting a new CAB that can." McPherson concluded that Congress ultimately "will probably have to" appropriate funds to make good on mail pay in future decisions by CAB.





## New Tunnel Throat Aids Transonic Study

NACA develops large test section to remove research blind spot.

By Robert Hutz

Development of a large-scale transonic throat for wind tunnels by the National Advisory Committee for Aeronautics has eliminated a blind spot in wind tunnel research and paved the way for a more thorough exploration of this critical speed regime.

The new transonic tunnel device forms a major step in the \$75 million construction program now under way at four NACA laboratories. This program is aimed at providing new research facilities for the transonic speed range and extremely high altitudes.

► **Transonic Throat**—Details of the transonic throat and other devices used to achieve wind tunnel flow through the transonic range from Mach 0.8 to Mach 1.2 are in a closely guarded research secret. However, NACA budget hearings on Capitol Hill recently disclosed that a 16-ft transonic throat is being installed in one of the Langley-Facility 16-ft wind tunnels and a six-ft transonic tunnel also is scheduled for construction there.

These new tunnels differ radically in construction and scope from the original NACA transonic tunnel developed at Langley by John Stull (Aviation Week May 30). The Stull design permitted transonic research only with extremely small models and at low Reynolds numbers. "Most critical work in this speed regime is for aircraft design on large models and low Reynolds numbers," NACA has determined that use of small models in the past has introduced a number of errors in the drag curve at lower speeds than have been proved out in test of large models or in flight tests.

► **Blind Spot**—The forces blind spot in wind tunnels through the transonic range was caused by the choking effect of drag waves in the tunnel throat. As a result of this blind spot, present transonic data is limited to that obtained by pieced-together pieces such as the NACA subsonic-supersonic wind-tunnel models dropped from 75,000 ft., and by using bombs as aircraft



Dr. Jerome C. Hunsaker



Dr. Hugh L. Dryden

used to produce transonic flow over the bomb with plates fixed at various speeds. These methods barely scratched the vague outlines of transonic air problems.

Contrary to general opinion, based on highly distorted versions of the X-1 supersonic flights, the real stand on the transonic issue is not being reached. Dr. Jerome C. Hunsaker, NACA chairman, emphasized the acute need for building up a complete air flow design data in transonic aerodynamics.

► **Scale Effect**—"All of our present air craft can enter the region (transonic) as they," according to Hunsaker. "New models of more refined design and increased power will encounter new problems for which design information is now lacking."

Dr. Hugh L. Dryden, NACA research director, indicated that the X-1 supersonic flights had alerted the aircraft industry's appetite to produce transonic military and commercial aircraft but left designers a long way from the goal.

Dryden pointed out that neither rocket power nor the X-1 design are suitable for transonic world aircraft operating in the transonic range.

He said the military transonic plane would feature swept wing design permitting low drag than the X-1. All but special interceptor types would be

powered by turbojet engines equipped with after burners.

► **X-1 Flight**—Dryden pointed out that early successful supersonic flights by the X-1 during the winter of 1947-48 had a marked psychological effect on the aircraft industry's designers.

"The general attitude of designers toward the transonic region was one of fear—the feeling that no airplane had to be equipped with air brakes so that if you were starting to enter the region you could get out of it as fast as you could or else you should have rockets that enabled you to go through very quickly. But as soon as the designers began to see what the critical losses in the airplane (X-1) were they immediately began thinking about ways of dealing with them and new ideas were appearing not only for designing new aircraft but for improving performance of aircraft currently under development."

► **New Plans**—Dryden indicated that new versions of the Boeing B-47 and B-52 bombers and North American F-86A fighter all aimed at transonic operation were in the design and build stages of the U.S. Air Force and NACA flight test program in the Bell X-1 were made available to the aircraft industry in May, 1948.

Immediately thereafter the industry requested NACA to create an all-branch committee to plan a transonic aircraft

program that would provide the data required by industry designers. With representation of 16 aircraft manufacturers participating, this ad hoc committee, headed by L. E. Rosier of the Ford Corp., drew up a basic program of data desired and new research facilities needed to provide it. Basic request for new facilities included the transonic wind tunnels and a facility to rocket-propelled model research at NACA's Wallops Island, Va., station.

► **Ford Fight**—NACA is making a \$75 million construction appropriation for fiscal 1950 to continue the program begun with a \$36 million appropriation approved by Congress last year. NACA asked for \$15 million in cash, the bulk of which will be used to liquidate previous contract authority and \$71 million in new contract authority for fiscal 1950.

House Appropriations Committee threw a black veto into the plans by dropping these figures to \$10 million cash and \$11 million in contract authority. House approved the cut enjoining the committee's vote that all basic aerodynamic research had been done during the war period and it was now time to hold aviation research at its present level.

NACA has earned its right for serious work on the Senate.

## Airlines May Buy WAA-Leased Planes

Airline purchase of approximately 100 DC-10 and DC-4s currently leased from War Assets Administration is in preliminary negotiation stage at Washington.

A first exploratory meeting held last week between representatives of WAA, Air Transport Association, and some of the individual airlines leasing planes will be followed by a second session soon.

These largest lots of WAA-leased planes are TWA, United and Eastern, each holding more than 30, but the list of other companies leasing planes includes Continental, Delta, Hawaiian Airlines, Mid-Continent, Northwest, Pan American, Capital, TACA, and West air. Leases on some of the planes expire in March, 1950, and others shortly thereafter.

WAA officials are busily seeking to get out of the leasing business, and dispose of remaining transport planes as a part of the gradual liquidation of WAA holdings. They reinforced the discussions with the War Assets Administration. Most airlines have indicated an interest in purchasing equipment directly from WAA, representing a reasonable price can be agreed upon. Indications are that WAA will not drive too hard a bargain, since present is no alternative. Most airlines are determined to get the agency out of the airline business as soon as possible.



CONVENTION REMINDER: of what stood up the investigation by checks will lead in this B-36 model on the desk at House Armed Services Committee Chairman Carl Vinson.

## Air Strategy Probe Set For July

House authorizes \$50,000 for investigation and counsel; Defense Secretary's control bill is temporarily shelved.

The forthcoming comprehensive investigation of B-36 procurement and air strategy by the House Armed Services Committee has delayed temporarily—and perhaps permanently—legislation strengthening Defense Secretary Louis Johnson's control over the service.

The investigation, unveiled only by a casual, off-the-cuff speech by Rep. Van Zandt (R, Pa.), started out at a probe into the Air Force's B-36 procurement program "and related matters." Its investigation has now been broadened to include virtually all aspects of its strategy (Aviation Week, June 13), and will probably lead to a showdown between Van Zandt and the defense and USAF long-range strategic imperatives.

► **Probe Scope**—The committee has unanimously voted to cover the following points in its investigation—some expected to get underway after July 1 holidays.

1. Was the decision to cancel the Navy's \$5,000 ton post-war carrier, United States, "sound"? Last year, a House armed services subcommittee, headed by former Rep. William Kent (D, Ohio), after a series of secret meetings, endorsed the carrier, and gave the Appropriations Committee approval to allow funds for it. Van Zandt was a member of the subcommittee. Congress provided \$9 million for the carrier for this fiscal year, and the House allocated \$15 million for it for the coming fiscal year. This was before Johnson's unsanctioned cancellation of construction. The 1950 fiscal year armed services appropriations bill is now before the Senate Appropriations Committee.

2. Is USAF putting too much emphasis on strategic bombing and neglecting tactical aviation—or support of ground forces?

3. Should two of the armed forces be able to "join up" the weapons of a third by a two-to-one vote in the Joint Chiefs of Staff? This will tie in the decision to cancel the carrier. It was moved by the vote of the Army and Air Force.

4. Establish the truth or falsity of all charges reported by Van Zandt (Aviation Week, June 6).

5. Locate and identify the sources from which the charges, rumors, and innuendoes have come. There have been counter charges that they originated from Navy circles and staff committees.

6. Examine the performance characteristics of the B-36 bomber to determine whether it is a satisfactory weapon.

7. Examine the roles and missions of USAF and the Navy (especially Naval Aviation and Mine Sweeper).

► **House Approval**—The House has approved a resolution authorizing \$50,000 for the probe and providing for a special committee to direct it. In two weeks of conferees, top members of House Armed Services Committee have failed to reach a decision on selection of the members. When Vinson called on Attorney General Tom Clark for a recommendation, Republicans took out a copy of "golden" Vinson reported that the decision on the committee would be by members of his committee.

Meanwhile, Vinson announced his

agencies to the unification legislation authorizing Johnson's control over Army, Navy and USAF. Johnson has estimated that the measure would make possible a savings of between \$5 and \$1.5 billion to the annual military budget through consolidation of activities between the services. It was approved by the Senate, the only approval coming from Senators who objected because it did not empower Johnson to transfer personnel and the combat missions of the services.

Vinson contended that the measure would be "expensive" and "would put too much pressure on the hands of the Defense Secretary." Previously, Vinson had named members of his committee of hearings on the measure to afford an opportunity to question Johnson on the matter. Consequently, after the H-R probe was approved Vinson cancelled plans for hearings on the unification measure.

## Idlewild Dispute Goes Back To Court

A sharp and bitter battle in negotiations between the airlines and the Port of New York Authority has defied the peacemaking intervention of the New York Supreme Court.

There was no heat that afternoon but brought forward are numerous and conspicuous acceptable to the airlines in fact when the meetings adjourned last week after a final 90-minute session, statements from both sides were in sharp conflict.

► **British**—The carriers—American, AOA, Capital, Eastern, Northwest, Pan American, TWA, and United—charged through their attorney George W. Whitehead that an "unacceptable stand" by

the Port Authority "caused the collapse of negotiations which began Jan. 23. Edward S. Collins, chairman of the Port Authority and a participant in the sessions, claimed the meeting broke up when the airline presidents refused to "even read or consider the Port Authority proposals with respect to the payment of landing fees on the basis of actual costs."

► **Liability**—The big issue from Justice Thomas J. Cook when he resumed hearings. Can the Port of New York, Airfields be sued? In their list of "concessions and compromises" the airlines included a stipulation that the Port Authority approve and reimburse specific legislation which "would make it possible for the airlines to sue themselves" on terms as favorable as they could find in the courts. "The Port Authority spokesmen admitted they were willing of arbitration agreement had been reached with the airlines.

► **Tariffs**—The airlines desire for fixed tariff schedules, in still-unsettling black in negotiations, although the carriers did some backtracking. Previously, the airlines wanted tariffs frozen for a period of ten years, but later changed the term to five years. The Port Authority, maintaining that landing and other fees must fluctuate with labor and other costs, called such a binding agreement "unacceptable."

Meanwhile, carriers will have been hearing arguments at LaGuardia and Newark Airports. Pan American Shuttle carriers are using Idlewild for overseas flights under the 1945 contract giving its traffic with the city of New York Supreme Court Justice Cook, who had resisted attempts to effect an out-of-court settlement, now has the case thrown back on his lap and other cases report operations throughout the country.

who may be contemplating tariff changes or new contracts, are anxiously awaiting Cook's decision.

## Union Election Due At Chance Vought

A long-pending union election at Chance Vought's Dallas plant to decide whether the International Union of Shipbuilders and the International Automobile Workers represents hourly production, maintenance and inspection employees, may be ended soon by the National Labor Relations Board.

Two other unions also will be involved in the election: International Brotherhood of Electrical Workers, IBEW, which wants to organize power house employees and maintenance electricians, and the Amalgamated Lithographers of America, CIO, which seeks to organize lithographers.

Previous attempts by the union to force an election were countered by Chance Vought management, which claimed there were too few employees in the Texas plant to permit an authoritative election. Company officials at Musk, when employment was low, estimated the plant eventually would employ 5000 hourly workers.

The NLRB filed the original petition with NLRB Dallas in May. A UAW-negated motion of 208 Chance Vought workers showed up at NLRB regional offices in Fort Worth with a petition and to have 2700 employees' signatures signed in immediate election.

Recently, an earlier labor peace pact signed by Chance Vought with the IBEW at a earlier last December was dissolved by an NLRB trial examiner. The examiner ruled that Peter Roscoe, an NLRB official had not been discharged for union activities.



WITHOUT LANDING GEAR, tail hook dangling, Sea Vangue lands on rollers not placed on carrier deck. This method, plus . . .



... EAGLE-class carrier as British hope to extend the naval use of jet aircraft.

## Britain Builds Up Naval Aviation

Steady development program being pushed, although new carriers still smaller, slower than those of U. S.

[McGraw-Hill World News]

LONDON—While the United States has scrapped its aircraft carrier building program, Britain is proceeding with a new, but steadily development of its carrier-based naval aviation.

British naval aviation staff has a long way to go to catch up with U.S. carrier use in service. Largest of the British carriers are the Eagle and Ark Royal in the 37,000-ton class. These compare with the three U.S. carriers of the 45,000-ton Midway class and the 65,000-ton of the advanced super-carrier prototypes.

► **Range**—Landed—Eagle was recently launched and will be commissioned by the end of the year. Ark Royal is still building at Birkland and is not expected in service before 1952. This class of British carrier is 501 ft. long with a maximum beam of 112 ft. Midway aircraft accommodation is 35-45 ft. high plus in addition to 61 officers of smaller radius.

Speed is expected to be better than the 32 knots of the fleet carrier rate of arrival.

U. S. Midway-class carriers have a

top speed of 33 knots, are 984 ft. long and carry a complement of 100 as planes.

One of latest British carrier plane groups will not be determined until after they go into service but it will probably not be more than 50 planes apiece.

► **Modest Carrier**—Of the seven 25,000-ton British carriers, six, the last is planned, is new in service. Two others are used for training, two in reserve and two, the Formidable and Intrepid, are undergoing modifications to handle the latest types of jet aircraft.

This type of carrier compares with the U.S. 27,000-ton Essex class of which the U.S. Navy now operates eight with a solution to five scheduled after July 1, 1949.

Essex class carriers handle 80 plane groups and have a speed matching the 32 knots of the British medium aircraft carriers.

The British now have four light carriers (15 knots) in fleet service with two more on special experimental sub-sea-warfare duty. Eight of five class now under construction but work on three has been stopped inde-

cated. These are, roughly comparable in the U.S. Jeep or escort carriers.

► **Speed Carrier**—There has been some criticism that current British carrier types are not fast enough to launch and land the latest jet fighters that are now coming into service. British official sources claim that even the light carriers are adequate for jet aircraft. U. S. experience has been that its latest operational jet fighters, the Banshee (F101) and Panther (F94) can land on a carrier deck but that they require, especially for take-off.

There has been considerable experimental work done in Britain on new types of carrier-based planes but only one jet fighter, a naval version of the Vulcan-Aerobreaker, Supermarine. A1 tanker has been ordered to quarters for carrier use. An experimental quantity of de Havilland Sea Vanguards, a small version of the standard RAF fighters, have been flown for carrier use.

► **Robber Dicks**—These Sea Vanguards have been used in experimental carrier operations without conventional landing gear (jet fuel). A rubber landing gear is laid on the flight deck. When the Sea Vanguards strap in, tail hook steps down land as the rubber anti-belly structure of the plane has to be reinforced for this type of landing but in no structural design has been constructed. Since carrier is aircraft performance starts were cramped-planned aircraft require extremely heavy landing gear to take the shock of arrested landing on the carrier deck.

► **Carrier Destroyer**—The new Hawker NT 40 jet fighter was originally designed for the British Navy but has not been ordered into production. A surprising reason of the Hawker fighter is none other.

British carrier doctrine is still to operate as fleet support. So far there has been no evidence of the development of a British naval policy of using carrier task forces in an element of strategic bombardment similar to the U.S. Navy doctrine that has been the source of so much controversy between the U.S. and France and Navy.



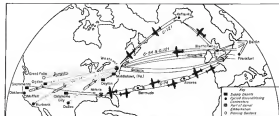
MARTIN SUB HUNTER TAKES OFF

Unusual take-off shot of the Glenn L. Martin Co. Martin (F9H) coming down its take-off ramp for the use of jet engines in addition

to two piston engines. First production model of Martin is now going down the Martin line at Baltimore. Navy has ordered

two piston engines. First production model of Martin is now going down the Martin line at Baltimore. Navy has ordered





TWO CONTINENTS linked by more complete MATS part of the airlift supply and overhead in the U.S., the actual life in Europe.

## Airlift Goes On To New Records

MATS not planning to reduce scope of operation, and is piling up experience in use of bigger plane types.

Berlin airlift is operating at full capacity despite the official lifting of the Russian blockade on May 12. U. S. Air Force plants delivered a record lot of 193,399 tons to Berlin via MATS in a daily average of 6,235 tons. High Tonnage—In the first 30 days since the May 12 blockade lifting, the U. S. portion of the airlift has delivered 661,875 tons for a daily average of 5,590 tons. Royal Air Force has delivered an additional 51,297 tons during this period for a total airlift of 213,772 tons. Total cost of the U. S. lift up to June 9 was estimated at \$793,235,183 by the U. S. Air Force.

Main reason for the fallacious impression of the airlift has been a strike of railroad workers in the Russian zone that has blocked rail traffic into the western zone of Berlin controlled by the British, French and American. Surface transportation is still limited to a few buses.

Low Weather—Observers recently returned from Germany admitted that

the only setback sign of the blockade lifting in the airlift is a slight easing of weather conditions at airlift terminals. There are no plans of attempt to reduce the scope of the airlift and the airlift task force in Germany is operating on the basis that the airlift will be continued indefinitely. Talk here officials indicate that the present C-54 fleet with replacements available from MATS would still through another winter of intense operations but would require more replacements in the spring of 1959. The lift is currently operating an average of about 215 C-54s a day with another 300 in the pipeline and maintenance bases.

Attrition rate on the C-54s now averages from one to three per week and is mounting steadily over other segments. Most of the attrition is due to non-fatal accidents that result in major airframe damage.

Yagme Trouble—Meanwhile investigations into the emergency landing of the Boeing VC-97A at Garmisch Airport

last month attributed cause to lack of sufficient valve lubrication causing motor area to fracture and the loss of power in two engines on the same side of the big transport. The VC-97A was carrying a payload of 48,000 lb. of baby food when the power failure occurred.

Loading was made on two engines during a heavy rainstorm on Garmisch's longer runway. Then landed still during heavy banking on the landing roll causing some damage to weathered runway surface and causing up part of the steel landing mat. The VC-97A was back in service three days after the landing.

VC-97A Test—It has now delivered over a million pounds to Berlin and is being operated on an experimental round-the-clock 30-day test to gather operational data on instrument use of this time machine. Previously a Douglas C-74 had been given a similar test operation on the airlift.

Being reports the VC-97A has been operating at takeoff gross of 115,000 lb. and landing weight of 100,000 lb. in regular operations with 40,000 lb. payload. VC-97A has been using only 3,500 of the 5,000 ft. T-10000 runway for landing. No birds are used in normal landing, all decisions being accomplished by sensing propeller pitch

employment at a high level.

That is the way the U. S. Employment Service sees the job situation in the aircraft industry. Because its view is based on reports from 56 aircraft plants employing 96 percent of the industry's workers, they reflect to a large extent how the industry sees up the business situation and outlook.

USERS Pledge—However, the picture USIES gives on aircraft jobs. Expansion of employment has run its course. Yet,

reporting plants indicate total jobs will rise about 2000 from June to August, swelling a total of 215,000. February's total was 215,190.

While employment will remain high, how high will depend on military appropriations for fiscal 1960. New funds available after July 1 won't begin to show up in jobs and production until October. Manufacturers expect to cut the number of jobs by a few hundred between August and October. That is

	Number of Firms	Employment	April	June	Expected Employment	Out
Total Aircraft	56	215,190	215,000	215,400	212,400	212,100
Complete Assembly	37	165,800	170,000	171,000	172,100	171,200
Engine	5	34,000	34,100	34,400	34,700	34,600
Propeller	9	14,000	14,000	14,000	14,000	14,000
Parts	13	16,100	16,900	17,100	17,400	17,300

due to transients about future orders.

Suez Canal—Although the overall employment trend has been upward, many individual plants have had to make deep cuts because of cancellations and shifts in military orders, which account for 95 percent of the industry's business. Of 32 assembly plants which report to USIES, eleven cut their payrolls between February and April and many of them anticipated further cuts. Seven of the 24 engine, propeller and parts plants made some reductions in their workforce late in the same period.

Fifteen plants expect to cut their working force before October, although a net increase of 1500 jobs for all 34 plants is forecast during the six months ending in October.

Labor Problem—Labor supply is

plentiful in most plants, so that nearly all out-of-line recruitment has stopped, except for engineers and highly skilled technicians. This situation has enabled aircraft manufacturers to raise their hiring standards and be more selective. Fewer women are being hired in the shops.

With experienced workers available, there has been no training problem. In-plant training programs now concentrate on developing better supervisors. A few plants are having some difficulty training under trainees.

Industry Report—Reports made by aircraft plants in April indicated their employment in February and April and the working force they thought they could expect to have in June, August and October.

## Fairchild's Director Candidates Named

Sherman Fairchild's Committee of Stockholders last week was selecting possible names from 10,000 owners of Fairchild Engine & Airplane Corp. shares for the Fairchild Institute's slate of directors.

It includes:

• **Richard S. Bostick**, general manager of the Aircraft Division, a vice president and director of the corporation, who

had been relieved of duties by current management (Aviation Week, June 15). He owns 500 shares.

• **Arthur Flood**, vice president of the Aircraft Division, who resigned of duties when he accepted his assignment to appear on the slate. He owns 208 shares.

• **George Lanning**, member of the Committee of Stockholders, and recent contributor to the President's Air Policy Commission. He owns 5000 shares.

• **Sherman M. Fairchild**, chairman of the board of Fairchild General and

Instrument Corp., and leader of the movement opposing J. G. Cullen, Jr., in the same 5,470 shares.

Others on the slate, with stock holdings in parentheses, are J. A. Allen, vice president of the Gene National Bank, member of the general Fairchild Board (1000); E. Anagnostis, vice president of W. K. Grace & Co. (1700); A. L. Baker, vice president and general manager of Keller Corp. (100); I. M. W. Fisher, partner in Bolton & Levin, ex-director of stockholders (5100); William D. Middleton, executive vice president of Monroe Auto Equipment Corp. (500); Frank R. Nichols, president of Nichols Bros. & Alphonse Co. (1800); and Charles H. Corbin, vice president of C. M. Cassano & Co., Inc. (200).

Point Of Attack—The committee which represents 124,000 shares told stockholders in a letter that electing the West group will not destroy "the money-making part of the business" and will not affect "the thousands of loyal employees who are anxious to contribute to the corporation." See the letter "We are proposing a failed team to replace the present one-man dominated management."

Included with the letter was a proxy form and a 24-page booklet, stating what the Fairchild Institute believed to be the issues, and a series point proposals.

Reduce the expansion of the burden of the West contract.  
Make no long-term profit-sharing or retirement agreements with any officer except with stockholder agreement.  
Move annual meetings from Hagerstown, Md., to New York City.  
Give stockholders a larger share of the corporation's earnings.  
Concentrate top management at the



This is the first flight photograph of Victor Vought's Supermarine experimental fighter—the 790—developed from the Al

SUPERMARINE TRANSCONQUEROR, which is notable as having swept back on all surfaces. It is powered by a Rolls-Royce Merlin engine of 2400 B. H. P.

thrust and should be capable of performing at high Mach numbers. Wings over tailplane probably houses automatic pilot.



CAPITAL'S EMERGENCY OXYGEN MASKS

To protect pilots against effects of carbon dioxide concentrations that rise from increased consumption of its O<sub>2</sub> during operation of the new heater for emergency system, Capital Airlines has equipped these planes with emergency oxygen masks.

plants where profits are made.

- **End one-man domination** of the company and encourage team spirit in management.
- **Look into possibilities** of extending corporation activities within the aircraft industry and into other fields.

Whether Sherman Pauchard can restore enough support through proxy statements to end current corporate management will be known July 1 when the annual stockholders meeting takes place. It has been postponed twice.

## PAA Switches Fuel In R-4360 Engines

In a change that Marly will have widespread ramifications in both civil and military operations, Pan American Airways has switched to a lower octane fuel for its R-4360 engines.

The new fuel, 115/145 octane (performance number) will replace 115/145 grade to reduce the performance effects of lead fading that have been plaguing many operations. The 115/145 fuel costs 4.5¢ of lead per gallon, as against 1¢ for the 108/135 fuel.

- **Performance Factor—**PAA has given its engine to use the lower octane gasoline following tests by P&W and PAA, which have shown that the fuel meets the necessary requirements.

Octane numbers are produced on the CFR (constant fuel) aircraft engine, and the P&W has found that the two grades of fuel give approx-

imately the same performance in the R-4360 under the conditions of PAA operation.

► **Simmons Supply—**Price of the 108/135 gasoline will not be less than the higher octane grade. This is because of the additional handling charges incurred by refiners who will still be supplying the 115/145 octane fuel to the military.

Presently the military, too, has experienced lead-fading difficulties, and it would seem logical for the service also to adopt the lower octane fuel provided performance characteristics meet with requirements.

To ease the problem of supply and price the war for a price reduction, PAA has approached the military on the question of standardizing on the use of the 108/135 octane fuel.

Many markets to PAA of the 108/135 fuel probably will be Ford Standard Oil Co for several operations, Standard Oil Co of California for West Coast and Hawaiian activities, and Shell Oil Co. for all requirements in the New York area. Texas will supply American Overseas when the latter gets its Stratofortress.

► **Other Methods—**Other approaches to the problem of lead fading are: (a) design out of emergency components in the fuel component of fuel and be changes in quenching design.

The Detroit is reported to be attacking the problem on the latter method and have accomplished some degree of success with plug design understood to afford scavenging through configuration

and at present O<sub>2</sub> from cooling the iron. A possible remedy by design would be to make the valves to work around an atomizer containing high concentrations of carbon dioxide or other chemicals as shown at right.

and volume of the space surrounding the entire cylinder.

## Aircraft Surplus

Emulating of approximately \$100 million in aircraft components from WAA surplus stocks to be used as defense aid in Western Europe is expected at the Senate today by the North Atlantic defense pact.

In testimony of Senate approval of the defense pact, Sen. McNamara said that the War Assets Administration, in London, on an estimate of aircraft requirements for Western European countries.

► **NOE Request—**National Military Establishment asked War Assets Administration for an additional screening of screening stock of surplus components to provide approximately \$100 million (original value) worth of equipment for European aid early in June.

Calling again on earlier notifications from the National Military Establishment in May, that its requirements of WAA surplus components had been filled, the new request has shown WAA's inability for complete liquidation of behind schedule.

► **New Deadline—**Fuel liquidation of components had been expected by June 30. However the new requirement has resulted in postponement of complete liquidation components liquidation by WAA or a subsequent agency, probably until June 30, 1949.

# ENGINEERING

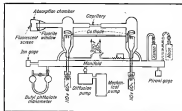


Fig. 1 Oxygen afterglow research apparatus for flow visualization (Ref. 1).

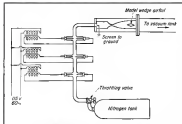


Fig. 2 Nitrogen afterglow research apparatus (Ref. 1).

## Solving A Wind Tunnel Problem

In the study of supercavitational, low density flow visualization, NACA uses nitrogen afterglow.

By Robert McLaren

Future aerial warfare will require missiles flying at extremely high speed and altitude. For purposes of research these two areas often are separated into hypersonic (very high Mach numbers) and supercavitational (very low density).

In the wind tunnel, however, both of these studies are characterized by very low pressures and it is becoming in-

creasingly difficult to assess properly the contributions of each of these fields to an observed phenomenon. Only study in the separate fields, with particular emphasis on the stresses of fluid flow.

► **Flow Data—**The science of supercavitational flows at fluid flows of such low density that the mean free path of the molecules becomes of importance. This is defined as the distance

a particle or molecule of a fluid must travel before it collides with another. As an index to the variation of this distance with density (usually, its value at sea level is 8.000007 ft), whereas at about 75 mi. high its value is about 1.0 ft.

However, these absolute values are of little practical importance and a new unit known as the mean free path, λ, is used to measure characteristic dimensions of an object (such as a model) immersed in the fluid. For example, for a model of a wing with a chord of 10 ft, λ would be of little consequence to a model 1000 ft long, but would be of great importance in the behavior of a missile only 1.0 ft long.

For research purposes, thickness, λ, of the boundary layer on the object, is known as the characteristic dimension, and the ratio λ/x is the controlling parameter in the determination of the relative importance of mean free path on the performance of a model.

► **Regime—**DeLaval-Adams flow tube is quite small (0.01 or less), the air may be considered a continuous and conventional compressible-flow medium.

As this ratio increases, however, chance of the molecules colliding with each other becomes about equal to the probability of their colliding with the wall or surface of the model. Therefore, the fluid still is no longer "thin" to the wall but, instead, will flow over the surface with a definite velocity. Regimes in which the ratio λ/x is less than 1.0, then, is termed the "slip flow" regime.

At values of the parameter greater than 10 (that is, mean free path is 10 times that of the boundary layer), the chance of the molecules colliding with each other becomes small and the gas may be considered a stream of free molecules colliding with the wall. This region is termed "free molecule flow."

First, just as the velocity spectrum is divided into subsonic, transonic and supersonic regimes, so, too, is the density spectrum divided into aerodynamic, slip-flow supercavitational and free molecule flow supercavitational.

Each of these regimes is a special field of study, with aerodynamics closely tied to aerodynamics, free molecule flow supercavitational to free molecule flow supercavitational and free molecule flow supercavitational to free molecule flow supercavitational.

As in all research, the first stage of the investigation of this new field of supercavitational flow was theoretical study which was begun by Moiré in 1879 and continued more recently by Zuber (who gave the term "slip flow" its name) and Tsiang (who developed it into a



Fig. 3. Absorption pattern on 50-day wedge as stream flows around nozzle. Stagnation pressure is 140 inches Hg. Mach 2.6.



Fig. 4. Nitrogen jet 50-day wedge. Stagnation pressure 60 inches Hg. Mach 2.6.

equally, body of scientific knowledge.) The second stage, experimental study, has been difficult and very costly by mechanical devices in the testing techniques of analysis of flow processes.

► **Flow Visualization**—The conventional schlieren method of flow visualization utilizes the refraction of light by density changes in the fluid to produce a qualitative indication of the flow field. It has proved an invaluable boundary tool for the study of transonic and supersonic flows.

As the Mach number of such studies has increased and the density of the flow decreased, however, the sensitivity of the light refraction has decreased to a point within the range of optical imperfections in the schlieren windows and mirrors, thereby rendering results very hazy and changes in test conditions.

Prof. Joseph Kaplan, of the University of California, suggested about two years ago that the ability of certain gases to absorb or radiate energy might be used to enable the stream to provide its own light for flow visualization.

Examples of the flow (absorption) type of gas are oxygen, which has a



140 PRESSURE RATIO APPROXIMATELY 9 TO 1



140 PRESSURE RATIO APPROXIMATELY 10 TO 1



140 PRESSURE RATIO APPROXIMATELY 11 TO 1

Fig. 5. Photographs of stream of glowing nitrogen with a stagnation pressure of approximately 20 inches Hg. (The nozzle does not fit in these pressure ratios.)

strong absorption band at a wavelength of 1470 Å (ultraviolet) and oxygen and nitrogen vapors, both of which have strong absorption at 2137 Å.

Under a contract with the Office of Naval Research, scientists at the University of California examined these three gases and determined that flow visualization is possible for a limited range of flow processes.

Both the mercury vapor and oxygen were abandoned for the purpose, because of the low vapor pressures and heavy molecules of the former, and the instability of the latter.

Preliminary tests with oxygen show it to have promising absorption characteristics. A hot cathode discharge tube with a screen anode was used for the generation of 1470 Å light. The cathode is fed from a 225-volt-cycle supply and is started by an arc of field at the capillary of the tube.

► **Oxygen Absorption Setup**—Fig. 1 illustrates the arrangement of the apparatus. The capillary section is viewed from the end through a fluorescent window. Oxygen pressure could be varied within a clamp by around the window. A second win-

dow, coated with fluorescent material, was pivoted to radiate passing through the fluorescent window.

An output photocell was used, change in fluorescent intensity was measured by a photomultiplier tube.

This absorption apparatus is used as a light source rather than a direct light source, and a sensitive fluorescent optical system provides the light. Light traversing the test section is absorbed by an amount depending on the density of the fluid. Changes in fluorescent intensity are then detected by a fluorescent screen as photomultiplier film.

► **Nitrogen Absorption**—A much simpler method, now undergoing investigation at NACA, makes use of radiation at "ultraviolet," a characteristic of the luminous center that persists in certain gases for an appreciable length of time after the source of excitation has been removed. Length of absorption in such gases as oxygen, argon, helium and mercury vapor is measured in terms ranging from microseconds to minutes, but that of nitrogen persists for times ranging from minutes to hours.

Absorption of nitrogen (ultra violet

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This variation in afterglow intensity with flame density compares a useful method for the visual observation of low-density streams in a wind tunnel.

► **Afterglow Apparatus**—Simplicity of the afterglow method lies in the mass used to excite the gas.

Fig. 2 illustrates the method used at the NACA Langley Aeronautical Laboratory. The discharge discharge tubes are 1 m. inside diameter, 10 in. long, and contain 1-in. diameter elements of electrodes with 0.04 in. diameter wires inserted through and projecting about 1 in. into the tubes.

The arcs are generated by 115v, 60 cycle supply, stepped up through transformers. First pair of transformers are rated at 1000v on the secondary and 100v-amp output. The other two are supplied with transformers rated at 700v on the secondary and about 100v-amp output.

Nitrogen is supplied from a pressure tank, through a throttling valve and into the arc manifold, where it is ac-cord. The glowing gas then passes through the top section of the tunnel, then into a large volume tank. An electrically grounded, fine mesh, stainless steel screen is placed across the entrance to the tunnel to eliminate arcing effects in the flow.

► **Afterglow in Schlieren**—To provide direct comparison between the arc afterglow and conventional schlieren methods, range of densities tested were those at which it was known that schlieren methods were of limited value yet high enough for comparison purposes.

Stade of a representative schlieren photograph showed that a normal shock would be barely visible at Mach 2.6 and a stream density of  $5.5 \times 10^{-4}$  gms per cu ft.

The afterglow, not at a static pressure of 1.0 mm. produced a stream density of  $2.5 \times 10^{-4}$  at Mach 2.6, so that the afterglow pattern were slightly above the minimum schlieren accuracy.

Results of the tests, as indicated by Figs. 3, 4 and 5 show that afterglow patterns generally resemble schlieren photographs but are more effective at the lower densities.

But a number of problems remain to be solved. Impurities in the nitrogen affect the intensity and quality of the afterglow, particularly the presence of hydrogen and water vapor.

A marked decrease in brightness of the afterglow is observable in the wake

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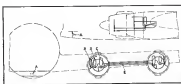
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AVIATION WEEK, June 26, 1949



Schematic layout of Goussier two-stage engine, with carburetor, fuel pump, and propeller. (A) Carburetor, fuel pump, and propeller mounted forward in belly. (B) 6th-stage carburetor, fuel pump, and propeller mounted forward in belly. (C) 6th-stage carburetor, fuel pump, and propeller mounted forward in belly. (D) 6th-stage carburetor, fuel pump, and propeller mounted forward in belly. (E) 6th-stage carburetor, fuel pump, and propeller mounted forward in belly.

## How to Cut Crash-Fire Dangers

Many fatal blazes can be avoided by use of inertia switch that operates regular extinguishing equipment.

By Neil G. Bennett

Fire is the greatest hazard left in flying. America's greatest killer, it is responsible for up to 70 percent of all fatalities in airplane accidents. It is a hazard by no means limited to any single type of operation but one which flies all who fly, the air traveler as the big transport and the air aviator as the military plane pilot.

Fire acts in a horrible way, but fire is a crash in a split second and more prevalent threat to life. We have made a big use in our efforts to prevent fires in flight. We know how to detect them early, and we are making rapid progress in learning how to extinguish them either early.

► **Crash Fires.** While there is still room for improvement in this field, just a brief study of the records will show that even more room for progress in aviation safety gains can come from efforts directed toward preventing fire in a crash, or extinguishing it in the moment's grace.

Efforts to reduce fire hazards began in Great Britain during the war. The Air Registration Board has long urged the importance of crash-fire suppression and has made such provisions mandatory. We associated with the problem in Britain believe we have evolved an effective means of lowering the likelihood of fire in a crash.

Modern aircraft are unquestionably safe vehicles. But they are not by any means safe as to fire in a crash or in a crash-landing. The designers can only say that they design their planes to fly, not to crash. But aircraft do crash and all too often the crash is the prelude to a fire which turns the ship into a pyre.

► **Crash Survivability.** There are few statistics available as to the exact number of deaths in accidents, for the evidence often is destroyed in the flames. We do know, however, that up to 70 percent of all crashes are irretrievably inevitable. An extensive study of crash survival problems conducted by the Air Ministry, Australia, investigated British aircraft during the war showed conclusively that almost all crash survival could be increased considerably if the seemingly inevitable crash fire could be prevented or delayed.

This conclusion was not reached experimentally, but was based upon study

of several thousands of crashes during the war years and especially through investigation of many hundreds of crash fires. Part of the study covered every RAF crash in Britain during the last war years and for part of the time included USAAF crashes as well.

While there were nearly 10,000 aircraft—some of which were damaged in crashes—the losses learned here a direct application to current commercial operations as well as current military flying.

► **Fire-Quarantined Risk.** The amount of serious flying and the inherent hazards of occasional flights give an opportunity for the study of an inherently large number of crashes. It is particularly noteworthy that while the Aero Digest Investigation Branch considered all phases of the crash survival problem it soon became apparent that emphasis on crash fires was imperative. Fire was found to be the greatest killer. And to long as aircraft tanks are filled with highly inflammable fuel in close proximity to hot engines, fire is likely to remain the burden of risk to the aviator.

The position is not hopeless, however, for not all airplanes burned themselves into hellfires on landing. Experiments showed that when no fire followed the crash, a high rate of survival might be expected. This experience reasonably can be expected to be true in a peacetime operation.

► **Crash-Cause Allocation.** Well over 50 percent of all crashes are associated with landing, landing or forced landing when the aircraft is moving at relatively low speed. There is evidence that the great majority of occupants can survive the impact in some cases that are not pinned in the wreckage or are ejected by injury to escape. The severity of fire in the wreckage would undoubtedly use the lives of the rest.

Second most frequent type of accident is that caused by flying into the ground when descending or flying into rising terrain at cruising speed. Here again evidence shows that at least a high proportion of the occupants can survive the impact. Actually, not more than 10 percent of all crashes occur with catastrophic impact such as is the case when a vertical instrument is struck on the aircraft does into the ground after structural failure or collision.

Manufacturers make not readily recalled as these groups account for another 10 percent, and a very small proportion of crashes are ditchings.

► **Airborne Equipment Shredded.** In the experience of crash fires, we cannot depend upon ground equipment. The fire experts are not always equipped, and the same can be said for the crash team outside the aircraft boundaries.

Even if the crash occurs on a well-equipped field, the delay in mounting

## Expert Opinion

Former Royal Air Force Wing Commander Neil G. Bennett has been called one of the world's outstanding authorities on aircraft fires. During the war he was at the accident investigation branch of the Air Ministry for 18 months studying structural accidents, then heading the post-war section. Early investigating light fire.

He is now chief engineer of the research division of Goussier Manufacturing Co., the principal British producer of turbine fire protection equipment. He recently completed an extended tour of the U. S. under sponsorship of Standard Aviation Services, Inc., studying fire-fighting methods in this country. Because of his extensive work background, Aviation Week asked Commander Bennett to write the accompanying article.

# Collaps-A-Hose

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AVIATION WEEK, June 30, 1949

the apparatus and reaching the plane may well prove fatal, for too speeds with explosive capacity, when high or low pressure is the fuel.

Valuable as ground equipment may be, we must look to airborne equipment if we are to get the maximum possible crash fire protection.

It is possible to get electric crash fire suppressors without serious weight penalties by using the engine fire extinguishing equipment and supplementing it with devices to operate it automatically in a crash.

➤ **Sources.** Possible sources of ignition in crash fires are: Exhaust flames from engines, hot metal such as exhaust piping, possible high temperatures or sparks caused by the mechanical action of damaged parts, sparking or burning from short circuits or grounds or from the increased functioning of unshielded electrical apparatus, and from sparks caused by ground friction.

Combined sources of drag right parts, previously not a worry at a case of propeller stoppage when striking the ground, might become a serious problem with free running turbines.

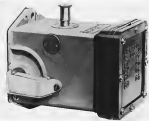
Nearly all danger of scrap metal being burned is a crash comes from the fact there is usually so much oil that it spreads rapidly through the wreckage. And it takes so little time when subjected to a fuel fire for more than a few seconds, a person cannot survive.

Much can be done to increase the chance of escape of the fuel and oil tanks. Danger from leaking and hydraulic oil, etc., does not come primarily from its own contribution to the severity or extent of the fire. The oil may start a comparatively small fire in a critical position, which although not a stall hazard, will almost certainly ignite any fuel flowing from several miles and thermal loads.

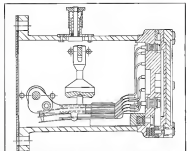
➤ **Equipment Evaluation.** Before considering what crash equipment can do, it is as well to consider briefly what it cannot do, at least for the present. It cannot guarantee prevention of fuel tank rupture, it cannot substitute tanks from engine exhausts, it probably cannot shut down an engine with sufficient capacity to prevent ignition of fuel poured as shown over the engine in the crash stages of a crash, it cannot put out a blaring flame at even a single blaring tank.

It must be clearly realized that crash fire protection equipment functions as a preventive. It can do much to prevent a fire from ever starting, a minor leak and even in a crash of considerable severity, but its effectiveness, especially in the latter case, will depend on the location and protection of the fuel tanks.

If the fuel is poured from a strained wing tank just behind an engine or



Current design type crash switch for fire extinguishing equipment. Device operates at predetermined value of G deceleration. Test tank is at rear, exit lines at side.



Section view of switch. Insects closed component position expanded automatically and spring-loaded lever can cut circuit through 99 deg. and fuel contents are expelled.

possible deceleration. When required G value is applied, pistons compress pressure on shaft and run valve through 99 deg., and fuel contents are expelled.

least before most of the aircraft has even hit the ground, not a crash switch, but a manual, is required to stop a crash fire.

➤ **Crash Switch Function.** This it appears that the task of a crash switch is readily discernible. It can do much to prevent ignition by, but of the sources mentioned and the effect, sparks from ground friction, it is likely to be a serious danger with considerable loss of cabin escape.

The following paragraphs, taken from

the Air Registration Board's paper No. 75, dated July 5, 1946, outline what can be done in each of the instances.

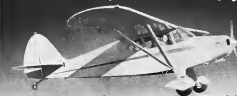
➤ **Exhaust Flames.** It has not been considered necessary to make the crash switch shut down conventional piston engines because before there is sufficient damage to post-mortem or tanks to permit a fire, the engine has been stopped by the propeller in the ground.

In any installation in which this may not occur the principle piston engines with shaft drives, fire resistance, or





# PIPER CLIPPER



A Complete **4** place Plane  
At less than **2** place cost!

only  
**\$2995** (Suggested retail)  
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Type  
Certificate

The flood of orders for the Piper Clipper is convincing proof of the overwhelming approval given this remarkable 4-place plane which sells for less than many 2-place planes, and for half the price of most 4-place planes.

Yet, veteran pilots, critical private owners and experienced operators have flown the sensational Clipper under all conditions. They've tried it fully-loaded from high-altitude airports and off air, tropical runways, they've checked it on long cross-country trips.

"Performance better than advertised" is their usual comment.

For \$2,995 you get a 115 hp plane which will carry four people cross-country at less cost than by bus. You get a comfortably roomy craft which cruises at better than 110 mph and has

plenty of "get up and go", fuel and spin-resistant, the Clipper has the added flight characteristic of riding through rough air with the solid feeling of a much heavier airplane.

Right-wing, prop-wash, the Clipper sets new standards of performance and economy which add up to new profitability for the private owner and new profit possibilities for the operator.

Amaze yourself with a demonstration flight in the Clipper before you buy anything, new or used. See your nearest Piper dealer or write to Dept. AEW-4, Piper Aircraft Corporation, Lock Haven, Penna. for illustrated brochures.

The Piper Clipper for 1964 also includes these four airplanes: Piper Mustang, Piper Arrow, Piper PA-12 Super Cub, Piper PA-11. Piper PA-12 and PA-11 Super Cub are 1963 models.

## CARGO SPACE



Door seat is quickly convertible for freight. Large rear door makes loading easy. No extra tie-downs.

## DESIGNED FOR PRACTICAL UTILITY

### PLENTY OF ROOM



There's plenty of room in the Clipper. Front seat is adjustable for added comfort.

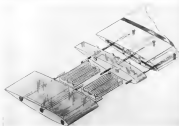
### 115 HORSEPOWER



"Round the world" "Opening up new Piper" - the Clipper is not only a great plane, but also a great investment.

**PIPER AIRCRAFT CORP.**  
LOCK HAVEN, PENNSYLVANIA

PIPER LEADS WITH A PLANE FOR EVERY PURPOSE



## Glow Tubes for Copter Tip Lights

A model navigation light installation for helicopters has been developed by Everett R. Stewart of Cleveland, Ohio, to provide greater visibility and safety for operators in night flying operations.

This new system uses glow tubes instead of fluorescent bulbs for longer life and provides the operator with additional warning signals of engine failure and green lights at the top of the rotor blades for maximum visibility.

Neon gas (for red) and xenon vapor (for green) are sealed in glass tubing less than 1/8 in. in diameter and heat treated several times to give a pattern of large glow areas—150 in. of tubing being housed in a space 4 in. square by 1/4 in. thick.

One red and one green light is cut into a transparent plastic cover. Outside surface of this housing is etched to the exact dimensions of the original 6 in. pattern of the blade tip.

A slip ring attached to the rotor shaft electrically connects the glow tubes to the power source in the fuselage, rotating shaft and the tip lights. An other slip ring in the form of a continuous rotor around the rotor shaft connects the red and green wires at the proper instant in the blades' rotation.

Red light in each tip is energized while passing through the quartz arc on the left side of the fuselage, the green, when on the right side of the fuselage. At all other times the lights are off.

Since the colored arcs on either side of the helicopter happen frequently, the lights appear to glow continuously. The glow tube makes direct pointing of extraordinary glow when on and controlled flame without damage.

The system is under scrutiny at the Naval Bureau of Aeronautics' experimental station, Annapolis, Md.

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*New*  
**LORD**  
*Radiofocal*



gives greater protection  
from vibration  
and shock!

With a background of wide experience in the installation of aircraft radio equipment, Lord has developed the Radiofocal, an advanced and complete mounting system.

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ERIE, PENNA.

Circle 40 on Reader Service Card  
Ruland & Associates, Inc. 1964

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Vibration Control Systems

YOU CAN BE **SURE**... IF IT'S  
**Westinghouse**



## A Lift and a Light for Berlin

"Aircraft's greatest achievement." That statement has been applied many times to the Berlin Airlift. And rightly so. The Airlift has changed all military logistic concepts . . . lessons learned from the operation will affect the faces of all aviation.

Among equipment selected for this vital task, the Westinghouse name appears with significant frequency . . . particularly in those applications where dependable performance counts most. Typical examples are shown on these pages. A new cargo hoist—more powerful and with many times the life of former units. Flashing beacon lights—that flash with a brilliance 9 times greater than the old's.

Transformers—that can take a direct stroke of lightning without failure.

These illustrate why, on the tough assignments—that call for unflinching performance—you'll find Westinghouse equipment being selected. And it is also why Westinghouse is your best source of supply for all your aircraft needs—from tiny aircraft lamps to powerful turbo-jet engines . . . from radio and radar to giant wind tunnels.

Check the complete line of Westinghouse Aircraft products. Call your local Westinghouse Office, or write to Westinghouse Electric Corporation, P. O. Box 368, Pittsburgh 30, Pa.

10111

### Hoist speeds loading and unloading

Westinghouse engineering was put to test when asked to design a cargo hoist unit that would be dependable under all conditions . . . be completely explosion proof. The answer is illustrated here. This unit can lift 4,500 lbs. of cargo at 24 feet per minute . . . weighs only twenty-two pounds. The assembly consists of a heavy four volt motor, a triple planetary gear, a speed limiter and a magnetic brake. Discard of its long life, no space could be saved by the glass, saving weight.

### Lights penetrate heaviest fog

A major problem of the Airlift has been its fog-hounding fog. To combat this condition, Westinghouse Flashing Beacon Lights are being installed in many Airlift fields for identification purposes. These lights make visual landings possible under worst weather conditions. Having 40 times a minute, the light can penetrate the heaviest fog for a distance of at least 1,000 feet. However, the peak flash does not blind the pilot because its apparent duration is so short. On clear or hazy days, or close to light foggy nights, the intensity can be reduced.

### Sure transformer operation

The "CSP" (Completely Self-Protecting) transformer—long accepted as the best transformer under all conditions—provides itself against lightning, short circuits and overloads. At the Airlift, 114 "CSP" transformers are being used for approach and other aircraft lighting.



**Westinghouse**  
LEADER IN  
AVIATION EQUIPMENT







# LET EX-CELL-O MAKE IT

Precision parts and sub-assemblies made to customers' specifications are an Ex-Cell-O specialty. Typical of the precision industry for the aircraft industry are the precision parts (at left) and hydraulic assemblies (above) shown on this page. Ex-Cell-O has complete engineering, machining, heat-treating, grinding, sub-assembly, and inspection facilities. In your specifications, Ex-Cell-O makes precision parts in small or large volume, and delivers them in accordance with your schedule. To see how this service can benefit you, write Ex-Cell-O in Detroit today.

## EX-CELL-O CORPORATION DETROIT 32

Special Machine Way Type Precision Boring Machines • Special Multiple Precision Boring Machines • Precision Boring, Turning, and Tapering Machines and Fixtures • Precision Cylinder Boring Machines • Precision Tapped Boring Machines • Precision Drilling Machines • Precision Bore Grinding Machines • Other Special Purpose Machines • Tool Grinders • Gear Grinding Machines • Bore and Bore Fixtures • Counter-bore Tools • Grinding Spindles • Hydraulic Power Units • Cold Chg. Machines • R. R. P. and Boring • Tool Grinders • Counter-bore • Gear Fixtures • Air Jet and Mechanical Production Parts.

—14—

## PRODUCTION

### More Magnesium Facilities Sought

Expanding need in aircraft production, creating threat of critical shortage, moves government to action.

Rapidly expanding military aircraft production has placed the Magnesium Board under attack to avert a threatened shortage of magnesium. Most critical shortage is expected to be in rolled magnesium sheet.

Recent developments:

- Government sale of its magnesium production plant at Shepparton, Tex., to Dow Chemical Co. Deal was being closed between Dow and Federal World Agency with Magnesium Board approval despite strong objections from the Justice Department on antitrust grounds.

- December 15, U. S. Air Force to Aluminum Co. of America to replace its magnesium sheet mill at New Kensington, Pa. The mill was closed two years ago after suffering heavy losses due to high demand for magnesium sheet.

Magnesium Board officials pointed to the rapidly expanding military aircraft manufacturing industry and the increasing use of magnesium in high speed military planes and turboprop engines as the cause of the expanding shortage of that metal. Official estimates indicate that between 10 and 25 million pounds will be needed by the aircraft industry during the next two years.

- Dow Note—Dow built the Potomac mill for the government in 1941. Oper-

ations were interrupted with its ownership at the same place. Each produced 20 million pounds of various magnesium a year. Two years ago, Dow bought parts of the government operation, the power plant and some buildings, but it declined to buy the mill because of possible antitrust charges.

The government facilities were completely sold with those of Dow's that were by experts agreed it would have been responsible for any one other than Dow to operate the government plant. When the Magnesium Board urged Dow to take it over, Dow wanted on the sale being closed by the Justice Dept.

The Justice Dept. took the position that no criminal violation could result from the sale, but that it could be contrary to common antitrust policy. The Magnesium Board decided that the national interest required that Dow buy and operate the plant and, it is reported, get "Where Those Looking for the side of the plant."

- Payment Plan—Dow paid \$600,000 cash and will make other payments based on production. At the end of five years, if the plant produces the expected 20 million pounds a year, the government will receive \$1,950,000.

This will double Dow's capacity for

magnesium production, since the capacity of its own plant is about the same as the one just obtained from the government.

Now get out of magnesium sheet rolling when it closed its New Kensington mill after losing money for as months. The plant has been dismantled and the personnel reassigned. More is reluctant to reopen the plant in view of the high cost of re-equipping its equipment and personnel. FVA estimates it would cost \$25 million to start a new small rolling mill. FVA doubts some aluminum rolling mill might be accepted by magnesium. The industry is skeptical of that.

The new magnesium sheet mill the government had during the war was run by Revue Copper and Brass. The government built it in Revue's Baltimore plant. After the war, Revue leased the equipment but gave up after losing \$2 million. The company is about the same as at Dow's Michigan mill.

Government experts report a shortage of magnesium fabrication in steel sheet rolling facilities.

### New AF Office

A new field office for northern California manufacturers interested in Air Force contracts is being established at Oakland. Capt. Loren H. McDaniel, Jr., officers-in-charge, and A. P. Johnson, production expert, will head the office.

Factories seeking contracts must be reported to the office to bid. It is affiliated with Los Angeles regional government field office of Air Material Command.



Inspection line of North American Sabre (F-86A) jet fighters undergoing final check before delivery to the Air Force. First

### SABRE PRODUCTION ROLLING

Fighters Group at March AFB, Calif., has already flown 1806 to its Sabre Fourth Fighter Group from Andrews AFB, Md.,

will be the second outfit to get Sabres with the 34th Fighter Group at Wilmington, N. M., next in line.

## Copters Abroad

A lack of foreign-built craft gives Bell chance to widen export sales.

Helicopter export market made fertile by lack of suitable domestic craft, is being heavily developed by Bell Aircraft Corp.

Latest shipment, Agusta 56 model 475 (24 percent of total domestic and for export) to 12 countries in South America, Europe and the Far East.

One big reason for foreign acceptance of the helicopter is the craft's inherent safety for cargo during, agricultural work and insect control in areas which otherwise could not be reached easily. Foreign countries are using copters in regions where the soil has been either neglected or entirely overworked because of unsuitability at lack of proper equipment.



## Seibel Copter Flying CAA Tests

Seibel helicopter Model S-4 is flying at Wilson Field, Wichita, Kan., for certification tests by the Civil Aviation Administration. Charles Seibel, president of the developing company, has disclosed. In above photo, test pilot John Gibbs is in the controls.

The new aviation organization may represent more exacting requirements than earlier experimental ships (AVIATION WEEK, Nov. 3, 1947). It is bigger and sturdier than the S-3 model which took almost two years to build and now has been more than a year.

►Two-Place—The S-4 will carry two men with basic certification being obtained on the flying from model. Various arrangements of removable seats in a fuselage will be made to function either for the pilot, for a student or it to be used for rescue work, or for passenger other uses.

►Disse Control—in some countries, mode from in agricultural functions, the copter is used to spray insecticide, control term—job which previously was accomplished by hand, and only in places that could be reached by ground transportation.

Bell has exported three 470's under the Marshall Plan—to the Ministry of Agriculture, Rome, Italy; one to Cooperative Helicopter, Paris, France.

Italy's copters will be used first as a two-man attack on malaria on the island of Sardinia. Then they will be put on spraying and dusting operations, particularly on central Italy's olive trees.

All three copters were manufactured by Seibel and Western Aircraft. Bell made its first foreign delivery in January, 1947, to Aikido-Export Film Overseas in Stockholm, Sweden. Since then Oerlemans has purchased four additional Bell copters for agricultural and geological work and carrying an aerial.

►Argentine Firm—Biggest foreign pur-

chaser to Argentina, with Trabzon Aero y Representaciones (TARSA), Buenos Aires, receiving 13 copters for insect control (they were used successfully in combating the Argentine locust plague), and the Argentine Naval Commission ordering six for military use. Formerly shipments: Argentina, 19; Brazil, 5; Colombia, 3; England, 3; France, 3; Iceland, 1; Iraq, 2; Italy, 2; Mexico, 3; Sweden, 3; Canada, 3; Philippines, 2.

Bell is continuing its program of training pilots and mechanics for helicopter operation, and also to the various countries to train aircraft.

## Canadair Readying Rudder Production

Canadair Ltd. hopes to start tooling for its latest-generation version of the Mustang Mk.4 in a month or two, and estimates that the first plane will be in the air within a year.

Canadair experts are enthusiastic about the Mustang, and they think a new will turn out to be the "last of its kind" for warbirds in the active world. As one official put it: "You can fly the plane in anywhere, land on a dune, bring out the helicopter you are carrying on board, then shoot yourself as a field."

►New Plant for F-86—Canadair's version of the F-86, also to be produced under license, will not be manufactured in the Montreal company's present plant but in a new plant belonging to Canadair Ltd. and Ford Ltd., which the Canadian National was previously produced.

Despite these new commitments, Canadair is not closing a leaf to production and sale of the Canadair Mustang Company will stay on a stand-by basis even if no new orders are received before completion of the British Overseas Airways Corp. order by September, 1949, three months ahead of schedule. Parts have been made in anticipation of future orders.

►Still Hope—So far, Canadair officials have been unable to secure new contracts for the Canadair Mustang. But the company believes Britain will need another 10-12 aircraft to replace the Tudor which would have taken care of South American traffic. Other cooperative buyers may be found in Italy and Australia, and Canadair is confident they will eventually get more orders.

The Canadair Mustang delivered to BOAC, near 1800 lb. less than conventional weight, which means a corresponding increase in payload. Landing weight of the Canadair Mustang has been increased by 1000 lb., so that the overall weight of the craft, as flown by BOAC, has a payload of 14,000 lb.



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Fast in action, light in weight, easy to handle.  
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Plenty of power to set the location, yet light in weight and convenient to use.  
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No. 22

# CLECO AIR TOOLS

Air power is safe, clean, flexible and highly productive. For air-powered tools built to highest quality standards, insist on CLECO air tools, bearing this familiar trade mark.

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Back of CLECO Products... with 25 years experience in precision manufacturing, is the REED ROLLER BIT COMPANY, one of the largest companies of its kind in the world.



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CLECO furnishes a complete line of valves, compressors, oxygen and tire fittings. Ask for Bulletin REF-37.

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Overall dimensions are 40 wide x 60 long x 16 in. high.



## Static Converter

D.C. electronic power supply, designed to power statically generated electrostatics, is marketed as Model 10 converter by Vane Mfg. Co., Inc., Box 615, Garland, Tex.

Device has no moving parts, is stated to operate at extreme altitudes and temperatures, and withstands extremes of humidity, salt spray, fungus and vibration.

Input is rated at 110-120v, 100 to 600 cycles, single phase, while output rating is 300-3 c., 6 to 400 ms.

Weight is 5 lb., displacement 185 cu. in. without shock mounts. Unit is reported to meet all USAF specifications 13617 A for Type E-1 static converter.



## For Prop Checking

Accuracy between for aircraft propellers, known as measuring problems, is made by Baker Mfg. Co., Greenville, Wisc. for use in manufacturing or maintenance operations.

Device indicates directly true angle setting of blade in hub assembly by automatic integration, is precision constructed, of measurements based on large number of points on blade surface. All sizes of blades can be measured.

## Glass-Panel Heat

For hangar, dope rooms, tower, field buildings, and other work areas, extremely painting heating problem "Electroheat" radiant heat panels are offered by Applon-Glass Panels, Inc., Springfield, N.J. Heating element is guaranteed for life. Heat is produced by metallic alloy grid inside wire cover of Tempra glass. It's stated that current passing through grid generates infrared heat with 25 percent greater efficiency than comparable indirect heating systems. Either permanent or portable models are available. Installation costs on permanent units are claimed to be low, since electric cable is connected to a c. or d. line or 220v. circuit without tracing out walls or partitions.



## Engine Pre-Heater

Aircraft engine pre-heater for jet and conventional planes, offered by Hanes Equipment Co., 3401 E. Olympic Blvd., Los Angeles 24, Calif., consists of a tank body, fuel pump, vent and heating apparatus.

Heater is equipped with electric controls, including pilot light indicating "on" and thermostat for oil temperature.

Storage accommodates 20 gal. in pump and 64 gal. for dispensing. Pumping capacity is 10 to 15 gpm. Tank is equipped with fire heated type, safety fill cap with trigger vent, spring loaded to prevent excessive pressure buildup. Thermostat and liquid level gage are also included.

Pump unit is assembled with three-way, three-port valve for pumping from outside storage or airplane tank into trailer tank, or from trailer tank into pump tank. Pump unit has time shifter fitted with 10-minute Manual lockout to stop at each time it goes through pump, regardless of operation.

Nonvalve type work platform is equipped with service door for easy access to filterless, liquid level gage, thermostat, pilot light, thermostat and pumping unit. Equipment includes 25 ft. of 1 in. diameter hose and 50 ft. of heavy duty, rubber covered cable.



## Fuel Valve

Unmodified yellow dot approved on No. 5400 motor-operated 11 in. aircraft fuel shut-off valve is announced by Spauld Inc., 1915 E. 35th St., Los Angeles 11, Calif. Designed for low flow, one-person operation, valve features vent seat, light weight, anti-shockability and easy maintainability. It operates at 15 to 30 c.p.s. It also is available for use in hydraulic and engine lubricating oil systems, and for air pressure applications. Unit is designed to operate at temperatures up to 100 F.



## Sheet-Holding Aid

Air part AF 518A, developed by Aircraft Tools, Inc., 2336 15th St., Los Angeles 11, Calif., for fast insertion and removal of sheet holders, is intended to boost production, maximize operator fatigue, and improve safety. Made of steel and brass, tool is designed to snap into places easily inaccessible with ordinary pliers. Fastener parts are heat treated to withstand wear.

Manual gives five positive grip. Its both shrouded and unshrouded types of holders, and reveals full 360 deg. Sheet holder is inserted into automatically gripping one piece. At touch of lever button, full air pressure is applied to holder allowing it to be inserted without shock. With button release, holder is locked in position and plier easily slipped away. Tool weight less 121 oz.

# NEW SOUTH WIND "929" DELIVERS 700,000 BTU/HR.



Developed expressly to meet installation needs, this highly-simplified "929" with 700,000 BTU/HR. capacity is especially suited for high altitude heating and thermal anti-icing of wing and tail assemblies.

## \*For Maximum Safety

The South Wind "929" has completely separate combustion and ventilation systems with individual air sources. The hermetically-sealed flame in the jet-type burner requires no air in fuel regulation, even under widely varying conditions. Makes possible the lowest outside case temperatures ever achieved in combustion-type heaters. And only South Wind has the exclusive built-in Flite-Check that automatically shuts off burner operation if the air flow falls below a pre-determined level.

## \*For Peak Efficiency

The "929" features highly simplified design to give more heat per installation pound. Both installation weight and cost are met by elimination of duplicate

thermal switches, fuel valves, etc., required in multiple installations of smaller-capacity heaters. The standard low stack and metal temperatures at peak operation are typical of South Wind burner design. The shrouded spark plug ensures automatic gap maintenance and prevents fouling. Fuel drains at both ends allow efficient, positive drainage regardless of the aircraft's attitude.

## \*For Easy Maintenance

The spark plug and nozzle are readily accessible through inspection ports provided in the "929" burner-case. The entire burner assembly is designed for rapid removal, service and re-installation.

## \*Adaptable to Any Type Aircraft

The complete line of South Wind heaters offers highly simplified design to solve heating problems in commercial, military and civilian aircraft. South Wind production facilities can now satisfy all delivery requirements on heaters from 20,000 to 700,000 BTU capacities.

WITH TODAY'S rapidly moving information or expert assistance on your aircraft heating problems. South Wind Division, Brewster-Wheeler Corporation, Indianapolis 7, Indiana.

## South Wind



AIRCRAFT HEATING  
AND THERMAL  
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**HERE'S PROOF of South Wind Leadership in the Nation's Finest Aircraft!**

<b>922</b> 30,000 BTU/HR. Burner 20" x 20" Stack 10" x 10" Fuel 1/2" x 1/2" Case 10" x 10" Weight 10 lb. Dimensions 10" x 10" x 10"	<b>930</b> 50,000 BTU/HR. Burner 20" x 20" Stack 10" x 10" Fuel 1/2" x 1/2" Case 10" x 10" Weight 10 lb. Dimensions 10" x 10" x 10"	<b>929</b> 700,000 BTU/HR. Burner 20" x 20" Stack 10" x 10" Fuel 1/2" x 1/2" Case 10" x 10" Weight 10 lb. Dimensions 10" x 10" x 10"	<b>906</b> 50,000 BTU/HR. Burner 20" x 20" Stack 10" x 10" Fuel 1/2" x 1/2" Case 10" x 10" Weight 10 lb. Dimensions 10" x 10" x 10"	<b>937</b> 100,000 BTU/HR. Burner 20" x 20" Stack 10" x 10" Fuel 1/2" x 1/2" Case 10" x 10" Weight 10 lb. Dimensions 10" x 10" x 10"	<b>944</b> 200,000 BTU/HR. Burner 20" x 20" Stack 10" x 10" Fuel 1/2" x 1/2" Case 10" x 10" Weight 10 lb. Dimensions 10" x 10" x 10"
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\*These aircraft are not shown from military equipment.





## Scandia takes off...

with perfect safety even from small and disturbed airports.

Moderate wing loading in combination with outstanding aerodynamic design gives the Scandia extraordinarily good take-off and landing qualities. Thanks to the great engine power and the excellent high altitude performance of the engine this also permits to operate the Scandia from high altitude airports without any large increase in take-off and landing runs.

In short, the Scandia is an ideal passenger plane for continental routes — on all parts of the world.

### PERFORMANCE

All figures refer to standard atmosphere

	Cashed aircraft No. 1001	
Max. take-off weight	22,400 lbs.	20,500 lbs.
CAR runway length for take-off	3,600 ft.	3,050 ft.
Max. landing weight	30,900 lbs.	29,200 lbs.
CAR runway length for landing	2,850 ft.	3,670 ft.
Stalling speed (V <sub>stall</sub> )	70 MPH	80 MPH
CAR 180° max. turn radius (computed at 15 seconds)	430 ft.	

SVENSKA AEROPLAN AKTIEBOLAGET • SAAB AIRCRAFT COMPANY • SWEDEN

AVIATION WEEK, June 20, 1949

## FINANCIAL

### Relative Market Action

Company	1947 Low	1948 High	Close June 4, 1949
Boeing	41*	101	61
BoB	37	100	14
Boeing	39	294	184
Convair	31	168	84
Consolidated	9	114	50
Glenn L. Martin	7	244	26
Douglas	45	671	56
Boeing E & A	4	51	49
Grumman	9	258	16
Lockheed	11	240	174
North	14	119	84
North American	7	119	84
Northrop	5	851	46
Republic	4	119	49
United Aircraft	37	380	214

Note: No adjustments made for cash dividends paid.  
All figures adjusted for 1947.  
\* Adjusted for stock split-up.

## Decline Noted in Aircraft Shares

Analysis of influencing factors shows equities resist general market trend and continue above 1947 lows.

Along with weakness in the general market, aircraft equities suffered new declines for the year in the recent selling wave. In a significant, however, that while the general market attempts to establish a new low since 1946, most aircraft shares, despite their sharp declines, are still above their low of 1947 points.

As a group, aircraft shares have been in a downward trend since 1946. The current uncertainty surrounding the proposed acquisition of the Convair B-36 effects more than the individual company involved. The entire aircraft industry is concerned, in consequence of this, equities may have a tendency to cut the general level of aircraft equities.

The accompanying table illustrates the market position of some aircraft equities at their 1947 low, 1948 high and recent levels. These periods represent significant milestones and further reflect the shifting fortunes of the individual companies. Selectivity of action in market movements is a distinctive characteristic of separate aircraft shares.

Generally, previous peaks were established during 1946. This was a manifestation of strong financial confidence, built by war orders and optimistic predictions, in some quarters, of a strong

continuing demand for military and commercial planes. As backlog demands and resources, in many instances, were disrupted through ill-advanced economic factors, and some of these factors in the market price of aircraft shares. The low point, for the group, was reached only in 1947.

The current market action for aircraft shares appears to be more concerned with future prospects and less with the existing financial conditions of the separate companies. Working Capital—Such considerations as Douglas and Grumman, for example, have working capital for six months of the market quotations for their shares. Douglas at present remains about equal with its 1947 low and 1948 high, but more than 11 points below the all-time peak of 1947 recorded in 1946.

Grumman, which has maintained a consistent reputation as a top-quality company in the aircraft industry, also has shown better than average resistance to the recent selling wave. The shares of this company are about 45 percent above their 1947 low and only 16 percent off the all-time peak price of 1946 and 1948.

BoB, which was approaching its 1947

low, received a sharp shot in the arm and rose 14 points in a week market as a result of an offer to its controlling interests to buy additional shares.

Market opinion of Boeing has been quick to adjust the decline in distance of that company, resulting from a series of cancellations imposed by the services. Despite these reductions, Boeing remains with the largest backlog of orders. Nevertheless, such cancellations must apprehensions among shareholders who do not always want to place the company's position in proper focus.

Market Performance—Consolidated Values and Glenn L. Martin have the least attractive market performance among the aircraft makers.

Convair is selling at a full 3 points below its 1947 low and only one third of the price prevailing at the peak of 1946. The Atlas Group, until recently, has been a consistent purchaser of Convair stock and remains the dominant stockholder. At present quotations, a nominal loss is evident in the holding of Convair by Atlas.

The Glenn L. Martin Co., hurt by re-equipment of transport planes, has suffered a decline of almost 80 percent from its peak price of 41, recorded in 1946, and is still some 45 percent from its 1947 low.

Actually, Republic Aircraft, in terms of the decline from its 1946 peak, has had the steepest drop of about 80 percent, but remains around its 1947 low.

The lack of uniformity in market moves among the aircraft shares again highlights the changing outlook for the separate units. Relative market observers attempt to appraise these shifts and suggest their measures for adjusting their investments.

Selectivity—For example, only last year, when both North American and Republic were selling at about the same levels, it would have been desirable to have sold the latter and purchased shares of the former. While it is true that a market low was not experienced by North American, it was far less than that shown by Republic.

By the same token, an ill-timed aircraft investor would have done well to have sold Convair and purchased BoB. In the manner, instead of a 30 percent loss, only a 14 percent decline would have been experienced.

Time has shown that the really astute investor would have sold all aircraft shares in mid-1948. Nevertheless, the aircraft industry represents such an important economic component that it is bound to attract a certain number of sophisticated investors looking for profitable contributions. As long as this condition prevails, there will always be activity among the aircraft shares.

—Sally Albrecht

AVIATION WEEK, June 20, 1949



## THREE TIMES AROUND THE WORLD— NON-STOP!



CONTINENTAL  
E145

When Harris and Kiehl landed their Aeroneo after its full week in the air, their Continental C145 had carried them the equivalent of three times around the earth without a stop! Like Capt. Bill Odom's two record-breaking flights in his E145-powered Beechcraft, earlier in the year, their achievement speaks volumes for the modern plane.



CONTINENTAL  
C145

## STOCK ENGINES IN ALL THREE FLIGHTS

The two Continental engines which figured in these new records were stock in every respect—identical with thousands of others powering planes in everyday use. The hour-after-hour dependability so spectacularly proved in these flights is typically Continental too. That's why Continental engines are first! First choice.

**Continental Motors**  
**Corporation**

Windsor Engine Division • MUELLENBACH, MISSOURI

## BRIEFING FOR DEALERS & DISTRIBUTORS

**CLIPPER SALES UP**—Best sales record for any one plane in 1949 thus far in the 129 sales which Piper chalked up in May for the \$2995 four-place Clipper, more than double the sales of its nearest competitor, the Cessna four-place 170, which had 59 deliveries. Fact that Piper delivered only one last place Family Courier in May might indicate that this airplane will not be marveled by Piper much longer. It's too competitive with the Clipper not to be last by the Clipper's success.

**FIRST TEN ONE-PLACES**—Mononey Aircraft Co., Wichita, in May reported its first delivery of 10 M-18 L one-places. A 65 hp. 1-cylinder engine replaces the Chrysler automobile engine which Al Mononey first used in the budget plane. Priced at \$1995, the composite structure plane is cooled with a 700 cc. engine at 115 mph. cruising speed, and a 40 mph. landing speed. It is equipped with a turn indicator which is a further development of the Mononey simplicity control used in the Cohan Model V. It coordinates movement of the engine tail of the engine, with the flap in turning for landings. Two-leaf gear struts normally place weight 500 lb. empty and carries 330 lb. useful load.

**CROSSWIND GEAR OPENING**—Lloyd Child, CAA personal flying specialist, points out that wind limitations announced on the Chicago kitchen strip on Northbrook Island, when the strip was under construction, do not apply for planes equipped with retracting landing gear for crosswind landings. Openwind limitations for any person on the strip because of wind are hereby imposed and not a CAA requirement, Child states.

**AVIATION EDUCATION SPECIALIST**—Pennsylvania Aeronautics Commission has agreed to pay salary and expenses of Miss Elizabeth Warrick, aviation specialist for the state department of public instruction. She will work with the aviation interests of the state and coordinate aviation education programs for the department. First step will be a program of public school teacher aviation education in which the aviation operators will be asked to cooperate directly with the schools of their communities. A flight experience program may be a later development.

**OPERATOR TICKET AGENTS**—Ramos Turner, whose new headquarters in Indianapolis is expected to start operations about July 1, wants to consolidate his local ticket sales in each city with the field base operator at the airport. Turner disclosed his plan recently in testimony before the Senate Interstate and Foreign Commerce Committee. "We will give the operator a percentage to handle the tickets and live his personnel in the time the airplane is in there and on the ground," the former racing pilot told the committee.

**MONOCOQUE DELIVERY**—First 1949 Monocoque with 145 gal. auxiliary fuel tank has been delivered to the Avia Flying Club in Avia, Canada, Dutch West Indies. The plane was flown by club members to Avia over a route which included 450 miles of open water. Auxiliary tank, extends the plane's range to over six hours at 140 mph. cruising speed, or 500 miles. Range is believed by the company to exceed that of any other two-place model. CAA has given approval on an enlarged C-C rating for the airplane which permits a baggage allowance of 110 lb. plus full passengers and gear load.

**CIRCUIT BUZZERS**—Washington State Aviation Assn. has announced a program among its 75 associate members to use that system. Buzz and low-flying "burn boys" are desired further use of airplanes in the state for survey, search up to a maximum of 32 months. Operators plan to notify all other member airports when a buzz pilot is grounded at one airport.

—ALEXANDER McSURELY

## SIKORSKY Helicopter NEWS



The past few weeks marked another milestone in our history here at Sikorsky Aircraft. Our smallest helicopter, a Sikorsky H-52, was put through its paces and came up with three additional international helicopter records.

On April 27 in Cleveland, at the National Air Races course, a three-kilometer world's speed mark of 129.5 miles per hour was established. On May 6, this same helicopter flew over a 100-kilometer Closed Circuit course right here in Connecticut and set a record of 122.75 miles per hour for this distance. Then on May 21, the H-52 took off from Sikorsky's own small heliport and climbed to a new altitude record of 21,220 feet.

With these three new records Sikorsky helicopters now hold all seven international major helicopter records. In addition to the three-kilometer, 100-kilometer and altitude marks are Duration, Closed Circuit made by a Sikorsky H-54, 9 hours 57 minutes; Distance, Airline, Sikorsky H-5, 703.6 miles; Distance, Closed Circuit, Sikorsky H-54, 621.4 miles; Speed for 1,000 kilometers, Closed Circuit, Sikorsky H-54, 66.6 miles per hour.

These records are something of which we are proud, of course, but the really important things are the dependability and versatility for which all types of Sikorsky helicopters have become known the world over.

Records, versatility, dependability, all are the result of the extensive research, sound engineering, thorough testing and painstaking production which is the everyday, working team that has made Sikorsky Aircraft the leader in the helicopter field.

SIKORSKY AIRCRAFT

## Just what is meant by

# STAINLESS

?

Some 30 alloy steels, each identified by its American Iron and Steel Institute number... able to thwart attacks by chemicals and atmospheres over a wide range of concentrations, pressures and temperatures... carry the family name "Stainless."

The addition of chromium in excess of 11% to steel provides, according to most generally accepted theory, a thin, adhering self-healing oxide film that protects the underlying metal. The result is a series of alloys highly resistant to corrosion and exhibiting in a wide variety of corrosive media.

Six per cent or more of nickel when added to chromium stainless steels produces a series of alloys of improved corrosion resistance known as the austenitic chromium-nickel stainless steels. Recognition by industry of this improvement is indicated by the fact that approximately two-thirds of all stainless steel tonnage produced is of the chromium-nickel type.

In the annealed condition austenitic chromium-

nickel stainless steels are strong, tough, ductile and pliable. When cold-worked they are effectively strengthened and hardened; a tensile strength in excess of 200,000 p.s.i. is easily developed. Annealed, and even in the cold-worked condition, they are adaptable to many forming operations. In all conditions they are readily weldable.

At elevated temperatures, austenitic chromium-nickel stainless steels are distinguished by their strength and outstanding resistance to oxidation. At temperatures down to -500° F. they retain their toughness and unusual strength.

Other elements are sometimes added to give specific properties: to improve machinability, enhance scaling resistance, improve resistance to corrosion in specific, difficult cases.

Leading steel companies produce austenitic chromium-nickel stainless steels in all commercial forms. A list of sources of supply will be furnished on request.



Over the years, International Nickel has accumulated a fund of useful information on the properties, treatment, fabrication and performance of engineering alloy metals, stainless steels, coin alloys, titanium, zirconium, nickel alloys, copper-nickel and other alloys containing nickel. This information is yours for the asking. Write for "List A" of available publications.

**THE INTERNATIONAL NICKEL COMPANY, INC.** 87 WALL STREET, NEW YORK 5, N.Y.

## AIR TRANSPORT

### Lightplane Airlines Get Boost

CAB okays use of single-engine equipment; Central and Iowa Airplane Co. plan to start service soon.

Lightplane airlines should soon become a reality.

Two certificated but long-dormant airlines may start service with single engine equipment this summer—Central Airlines, Oklahoma City, and Iowa Airplane Co., Des Moines.

Central is interested in using four-engine Cessna and Beech Bonanzas over its 1100-mile system which extends from Oklahoma into Kansas and Texas.

And Iowa Airplane Co. is reported to be considering use of four to six place Cessna 180s or 190s on its 1200-mile system in Iowa, Minnesota, South Dakota and Nebraska.

► **CAB Helps**—Like two current plans for attracting new routes with light planes were forwarded each this month when the Civil Aeronautics Board approved the use of single-engine aircraft and small nontransport type craft in the aircraft for scheduled transportation of passengers under certain limitations.

The Board specified that one of such equipment in scheduled air transportation must be certified to day VFR (visual) conditions and in particular must show topography to be suitable for single-engine operations over relatively short distances. CAB added that no instrument operations or long overwater type would be permitted with single engine air transportation type craft or cargo aircraft.

► **Financing Difficulties**—Central was reportedly certificated in November 1946, but was unable to raise money to finance conventional feeder operations with transport-type equipment such as DC-3s. Its certificate is due to expire next May, pending an extension by the Board.

Iowa Airplane was selected for a certificate in December, 1946, and actually received its license in June of last year.

The certificate's expiration date is June, 1951.

By using lightplanes instead of transport-type equipment, Central and Iowa Airplane will be able to serve many communities. Because of much more aircraft, Iowa Airplane would have been able to schedule only two of its flights each week, although it is said DC-3s.

With lightplanes it can serve all 29 points.

► **Airline's Delayed**—Both Central and Iowa Airplane wait among the few airlines which several months ago were ordered by CAB to start operations by July 1 or face Board action to cancel their certificates. Other airlines told to get started were Paine Air Lines, West Se Louisiana, Arkansas Airways, Phoenix, and Rescue Tanager Aeronautical Corp., Indianapolis.

Turner plans to investigate once this summer with DC-3s, but probably will be unable to meet the July 1 deadline.

Turner's company has asked CAB approval to transfer its certificate from Rescue Tanager Aeronautical Corp. to Turner Airlines, Inc.

► **Equipment from Noseled-Col**—Rexco Turner, president of the aeronautical corporation, will also head the new airline company. Nations Air Transport Service, Inc., Morris Springs, Pa., a noseled operator, is to help Turner Airlines get started.

The national authority will furnish DC-3s and help in supplying necessary equipment in addition to operating personnel.

Col Turner told the Interstate and Foreign Commerce Commission recently that he had financing arranged for his airline but was unable to get CAB approval. (Continued on inside) (Continued on inside) had secured it off.



EASTERN AIR LINES LOOKS SOUTH

Keeping a wary eye on new flights to its neighboring traffic with Latin America, Eastern Air Lines has asked the Civil Aeronautics Board to grant it a vast network of direct routes in the Caribbean area. The new route would extend EAL to 19 additional points in Central and South America and the West Indies. Eastern is fighting Nations Airlines' proposed equipment interchange with Pan American Airways and change with Pan American Airways and change with Pan American Airways and change with Pan American Airways.



# Leach relays of tomorrow...

## IN DESIGNS OF TODAY!



LEACH RELAY COMPANY has been in business for over 30 years designing, manufacturing and assembling thousands of relays for thousands of applications. Leading edge of military and military aircraft, including LEACH RELAYs in standard equipment. These include AN, AAF and NAF types, also included are ANF approved substitutes for AN types. New designs and standard sizes are in a constant state of development for specific requirements.

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## New kind of Buyer Now Dominates 4-Place Market

Buyers indicate that more and more are buying more in business and professional than these days—most who haven't signed much, name and look for a quick sale and easy-to-place.

Buyers like these are interested in a big, comfortable plane that they can fly safely themselves—and one that has maximum utility as a cargo-carrier. Many mean look about as rough deal, looking a part of their every day flying. Small wonder then that 1968 first quarter figures show Ryan's new four-seater is in the place.

Normally, however, dealers are seeing increased profits from the market change.

A Ryan (and other) airplane is one of the most popular in the industry. The product is backed by a unique and profitable service policy, and a hard-hitting national consumer advertising and merchandising program.

Many of these desirable dealer characteristics are available in qualified business owners. A list of buyers to Ryan Aircraft Company, 100 Lindbergh Field, San Diego, Calif., will bring you clear details by return mail.

(10)

## MORE AND MORE YOU HEAR:



You more and more you hear about promoting exports, export agencies and private export sales. You're in this business. They know that for 10 years Van Dusen has made it a point to service only quality suppliers of the world scene, but always with prompt, friendly service.

As a result, Van Dusen is a leading name in the world's export scene. They know that for 10 years Van Dusen has made it a point to service only quality suppliers of the world scene, but always with prompt, friendly service.

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## Key vs. Voice

CAB to hear argument  
whether ocean planes  
should carry radars.

The Civil Aeronautics Board is getting the last political and economic use of short commercial transports used in long overwater flights should be required to carry radio-telephone operation and equipment.

Ever this year, the question brought National Airlines and Pan American Airways into sharp conflict with CAB and AEA, communication groups. The groups charged that the carriers, in attempting to communicate, were jeopardizing safety. Management replied that the carriers were using land-based facilities.

Finally, the problem has shown signs of becoming a political issue.

Representative William W. Hastings, the Flight Safety Officer, Air Safety, Civil Aviation, representing both CAB and AEA, groups, asked CAB to suspend National Airlines' flights between the Pacific northwest and Honolulu until the carriers added a specified communication officer to its crew, and installed radio-telephone equipment. According to the carrier, NWA planes using only pilot-operated radio-phones could not communicate directly with surface vessels in case of an emergency.

Northeast replied that its over radio communication was superior to the telephone. The carrier, adding that the former had been approved by CAA. It said that distress messages could be sent by voice to shore stations and relayed to ships about to sink in the key communication area was difficult.

Agreed to Compromise. When Pan American flight data personnel, faced with the prospect of losing their \$500 per month plus in radio telephones, asked for a Congressional investigation. Michael J. Quinn, president of the Transport Workers Union of America (TWU) demanded flight legislation to require all aircraft on overwater flights to maintain radio-telephone contact on the 500 to 1,000 international flights per month.

The carrier received endorsement last month when Sen. Edwin Johnson (D., Colo.), chairman of the Senate Commerce and Foreign Relations Committee, introduced a bill requiring all overwater flights to be equipped with radio-telephone (land qualified operators) capable of communicating on 120 Hz.

►CBO Favored—The legislation, the CBO officials will implement it, demand that all transoceanic aircraft carry

a bare operating crew of five: pilot, co-pilot, engineer, radio officer and navigator. In taking its decision in Congress, CBO considered the short-term policy of the carrier, commercial aviation which has the experience of the CAB and CAA.

In announcing it would hold hearings on the controversy, CAB said the basic question is whether the ability to communicate with surface vessels on the 500 to 1,000 frequency is necessary for survival in the event of an emergency requiring ditching of aircraft at sea, or whether the necessary communication can be handled more effectively on appropriate radio frequencies. Written briefs by interested parties must be submitted to the Board's Bureau of Safety Regulation by July 5. For those representing it, and arguments to be held within 10 days after filing of the briefs.

►Specific Questions—Among the specific questions CAB must answer are:

- What are the probabilities of emergency conditions when the ditching of an aircraft at sea may be required?
- Are the time and distance factors with respect to oceanic search and rescue so critical as to require ditching of land aircraft in the near vicinity of a safety zone?
- Assuming the answer to the previous question is affirmative, are adequate communication means available to permit search to locate and land over a surface vessel?
- What are the most efficacious means of communication to establish contact with surface vessels in case of an emergency?

## TWU Investigating Communist Activity

Michael J. Quinn's Transport Workers Union of America has ordered a special committee to investigate "as to accept by the Communist Party to control radio organization in the U.S. and overseas."

Specifically, the committee will look into Communist activity in the TWU's air transport division, mainly in the Alaska, Yukon and New York lands according to the union's official organ, the "Transport Worker." In a resolution adopted at the recent state annual session of its international executive board, the more drastic its committee "to investigate every phase of the Communist Party's activities in the air transport division. The union must recommend measures from the committee, including: if necessary a recommendation to require the entire air transport division of TWU."

At its session, the executive board

condemned the committee for undue interference in an organization within the air transport division—only United States Airlines and Alaska Airlines, "discredited union officials," as leaders of the movement. Skoloff and Frey are officers of the Alaska land, cited by the TWU Express as the "root of the movement, leading disruptions in TWU."

## Philadelphia Survey

Alvin F. Adams and Associates has been selected by the city of Philadelphia to conduct an economic survey of the metropolitan district, in order to determine the adequacy of Philadelphia's transportation system.

Survey will also determine the needs, which Philadelphia should use for planning for the future, or terminal in the light of possible requirements.

The Adams organization will handle traffic and airport infrastructure forecasts annually through 1960.

## UAL Thins Stock

United Air Lines has supported the Western Co., Berkeley, as manager of a large stock of new DC-1 and DC-4 parts and equipment.

The airline is expected to allow UAL, from maintaining a large sales force in order to dispose of surplus equipment.

## Idlewild Range

Ten Idlewild Lightships, located as a guide to mariners, is now a significant loss for transoceanic airlines.

First leg of the New York International (Idlewild) Airport radio range has been placed over the lightship, less than 10 miles from the southeast leg of the Mottled range and the north leg of the MacArthur Airport radio station.

## Freight Holds No Lure for Cal Eastern

California Eastern Airlines, fearful one of the nation's largest all-cargo carriers, apparently has no intention of going back to the freight business in the near future.

The Oakland, Calif., company has announced its objectives are two-fold: to continue losing its C-54s, and to purchase its surplus for a certificate to operate 597 international medium-range passenger service on its own. The carrier, under the name of a cargo operation in May 1958, because of financial difficulties, after losing more than 15 million freight ton miles in order to cover losses. Since then, it has been losing its plane to such an

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Wittek Aviation Hose Clamps meet current AEA specifications and have C.A.A. approval.

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438 E. 14th Street  
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Dependability in Your Clamps  
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## Airfleets Hopeful

Aerflotte, Inc., indicates it will soon arrange to lease new transports to several domestic carriers.

W. C. Macdonald, vice president of the firm that was organized last September as General Equipment Corp., and a firm proposal for financing an equipment leasing deal "probably can be submitted to the Reconstruction Finance Corp. before long." He added that while General Equipment will be the first transport leased by Aerflotte, the company intends handling other planes.

**Minor Problem**—Early this year, Capital Airlines was seriously reeling in leasing Chevrolet trucks through Aerflotte.

But the carrier was unable to swing the deal successfully, and there have been no recent negotiations.

Most of the domestic airlines have failed to secure new firm engine equipment during the past year period because of financial difficulties and a willingness to see other carriers work the "bug" out of new planes, these airlines have been skittish as potential customers.

Aerflotte is headed by Floyd R. Callahan, who is also board chairman of Consolidated Value Aircraft Corp.

## WAL to Edmonton

Western Air Lines will inaugurate service to Edmonton, Alberta, Canada, as soon as operational details can be cleared with the Canadian Air Transport Board, according to President T. C. Donahue.

WAL, which has been flying in for work in Lethbridge, Alberta, since 1940, was granted operating rights to Edmonton in the controversial new air transport agreement between the U. S. and Canada. CAB originally certified Western to serve Edmonton in August, 1946. The extension will add 287 miles to WAL's routes, bringing total route miles to 4095.

## CAB Denies Plea

The Civil Aeronautics Board has denied the petition of Trans-Texas Airways for immediate removal of last month's order requiring the airline to show cause why its route certificate should not expire in May, 1950.

## New PAA Officers

Two new Pan American Airways vice presidents were elected by the carrier's board of directors last week. John T. Brown (USN, Ret.), becomes a vice president in the executive department, and PAA Capt. Harold F. Gray, who has been manager of the Pacific-Hawaii division, is now vice president in charge of that division. Thomas had been assistant vice president.

## SEARCHLIGHT SECTION

**EMPLOYMENT "OPPORTUNITIES" EQUIPMENT**  
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**BUSINESS** (For sale or lease)  
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We have a large stock of surplus aircraft and equipment for sale or lease. We are also interested in buying surplus aircraft and equipment. Write for our latest catalog. No charge.

### Need A Pilot? Need A Job?

Are you available to fly the Atlantic to Europe, the Pacific to Asia, or to other parts of the world? We have a large number of jobs available for pilots. Write for our latest catalog. No charge.

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### BUSINESS OPPORTUNITIES

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### Rising Sun

WANTON SURPLUS TANK ENGINES

Continental Models W675-A



STRICTLY PERSONAL

**VOICE FROM THE RUGGED WEST**—Midcontinent Airlines says their new after-midnight coach service between Twin Cities and Kansas City attracts real interest and the best example was the demand from the great in K.C. the other day, who walked up and said, "Give me a ticket so that I can catch to Minneapolis."

**FROMBING NEW MARKET FOR COPIERS**—From Deane, who took over Walt Roney's old job as CEO at Bell Approach Corp., two of his many letters of inquiry last week were passed around to quite a few Bell people. It wanted to learn about performance, speed, fuel consumption, cost and one-time purchase plan offered. It asked how long a warranty period was needed before takeoff and whether a Bell copier could carry two probes and 100 lb. of baggage for 1000 miles, and whether it would be affected by any drop in maintenance. The letter was signed by a "Mr. Deane" and was dated "The United States of America at Memphis, TN, because, that's where you wrote the letter."

**WHEN'S A DC-3 NOT A DC-3?**—Edward Doberty, 100, back as soon after his promotion to assistant director of public relations for American Airlines (above), says that airplane pictured as American's launch to the DC-3 WAS a DC-3. Ed contends those who think otherwise must have the DT. Pasty in your own defense, no quote Ed.

\*TWA's sleeper version of the DC-3 was called not D78 but SDT (Sleeper Day Transport). It was distinguished from American's D61 in the fact that it had four berths compartments forward and six-up seats in the rest. The D87, which is a DC-3 sleeper type, was an all-sleeper plane. But no matter how you call it—SDT, D87, or just plain D78, it still is a DC-3 and that's why we book it forward in our stage coach."

**EVEBROD'S CALLING INTO THE ACT**—Cheney's Attorney General says Transport Editor, though CADR deserves negative gut punch as a whole, and that in one of those times we should try to understand what it puts up with. He sends along a memorandum my official looking thing called OOD, Serial Number E-019, dated signed by CADR's secretary, M. G. Shanks, in the name of the "Executive Director," which states that the "Executive Director" has been assigned to carry current period under section 602 of the Civil Aeronautics Act of 1938, in amended. Based down, it declares that Halsey M. Smucker during business as Smokers Group, does not have a substantial interest in the subject matter of the proceedings and thus he requested investigation "will enable broader the asset of the company." The memorandum is signed by M. G. Shanks, Jr., Secretary, at Smoker's Casino, at Las Vegas, Nevada, and is dated April 1, 1971.

**THE STORY OF 12,000 STORIES** You probably won't find this treasure anywhere else on your summer reading, as we pore long over scientific intelligence from one of these intrepid Northwest Airlines post-bleat Nancys, that a party of 12,000 mosquitoes recently took a trip on NWA and didn't annoy the other passengers a bit, because they were stiff. (The mosquitoes?) Says NWA: The mosquitoes, gathered in the Caribbean through the jetway's moths, were frozen in a scientific laboratory, then put in a barrel covered with dry ice and sealed tight. They were sent to the National Institute of Health. Let's assume on a scale of 1 to 10 that this was a good idea, and more about the issue, in a research study of campylobacter. Now you, New Mexico, know what to do with your nephew's diaries, and it will help anyone. *Joe*

**A NEW MARVEL OF THE AIRLIFT**—You may remember Don Rowen, *Sick Airways'* former Newark station manager whose teletyped reports about selling papers in Newark was printed here. He's on leave from Shal, on the Berlin Airlift. He asked M.C. Wilson, Shal's assistant general sales manager, to tell us what he heard on the airwaves.

Tower "Roger, Big Wilkie 78 over the range station, leading instructions, please"

SW 75: "Rhin Main Tower from 75. It takes two minutes to a 180° Tower." Roger, 75. Do a 180 and back it in."

## WHAT'S NEW

### Trade Literature

**Kemp Dryers for Air, Gases and Liquids.** 32-page catalog on desiccant-drying of air, gases and liquids, available on request to: C. M. Kemp Manufacturing Co., Beltsville, Md.

**"For Practical Men,"** a booklet on landrath neotrance tanning and maintenance hints, available on request to: James G. Huddle Co., 1316 Arch St., Philadelphia, Pa. 19102.

"An Improved Model Bull Drop Seat," by A. M. Weber, Air Navigation Device Development Division, Civil Aeronautics Administration. Direct request to Civil Aeronautics Administration, Washington, D. C.

"Bulletin 110," covering specifications and applications of recently developed Parker liquid level control valve, available on request to Parker Appliances Co., 37125 Euclid Ave., Cleveland.

"Design Guide," covering expansion joint selection and applications, available upon request to Chicago Metal Hose Corp., Nileswood, Ill.

"Air Valve Catalog," a 20-page booklet showing drawings, specifications for parts and cutaway views, available on request to Corcoran May Corp., Baltimore 3, Md.

"Whorloo Controls," basic range of the Whorloo Instruments Co., denotes different types of temperature control applications, available on request to Whorloo Instruments Co., 547 W. Harrison St., Chicago 7, Ill.

"Alkanol and Engine Thermocouples and Accessories," a bulletin describing and describing most frequently used thermocouples, quick coupling connectors, terminals, lead wires and accessories, available on request to Thermo Electron Co., Englewood, N.J.

"**Welding Notes for Engineers**," a bulletin with articles in case history style on typical problems of repair and construction, available on request to Estotek Welding Alloys Corp., 48 Worth St., New York 13, N.Y.

"Welding Catalog," covering accessories, available on request to Air Reduction Sales Co., 60 E. 42nd St., New York 17, N. Y.

"Reversing Current Contacts," a bulletin on Hartman generator control relays, available on request to Hartman Electrical Mfg. Co., Mansfield, Ohio.

"Belt-Mounting Bulletin," covering industrial machine and feeders, available on request to Hartman Electrical Mfg. Co., Mansfield, Ohio.

"Silver Line," covering the Thor portable electric tools, available on request to Thor Independent Pneumatic Tool Co., Ames, Ill.

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# AMPERES ON RUBBER TIRES



This portable 500-amp aircraft energizer was developed a few months ago by General Electric engineers to furnish commercial and military air bases with a convenient 28 $\frac{1}{2}$ -volt ground power supply. The heavy-duty power source provides plenty of amps for starting jet and reciprocating engines, for pre-flight check of the aircraft's electrical system, for production tests in shop and hangar repair areas.

Mounted on wheels, the energizer can be furnished with either gasoline-engine drive mounted in a trailer (as in the photograph) or a-c motor drive mounted on a two-wheel dolly. The basic generator and control system is available also for "Jeep" mounting. The mobility of the unit permits faster takeoffs as well as strategic dispersal of aircraft during hostilities.

This power supply is one of many products manufactured by General Electric for the aviation industry. G-E engineers are continually at work designing new and better products to increase efficiency and cut operating costs. Get complete information on our aviation products from your nearest G-E representative. *Apparatus Department, General Electric Company, Schenectady 5, N. Y.*



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